HELSINKI SCHOOL OF ECONOMICS (HSE)
Department of Accounting and Finance

THE EFFECT OF INSIDER TRADING ON JUNIOR NATURAL RESOURCE COMPANIES

A Study of TSX Venture Exchange Listed Stocks 2002-2006

Finance
Master´s thesis
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Spring 2007

Approved by the Council of the Department 29 / 5 2007 and awarded
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ABSTRACT

DATE MAY 18TH, 2007

THE EFFECT OF INSIDER TRADING ON JUNIOR NATURAL RESOURCE COMPANIES: A STUDY OF TSX VENTURE EXCHANGE LISTED STOCKS 2002-2006

Objectives of the Study : The objectives of this thesis are: i) to determine if there is any new information conveyed to the market in the trades of insiders of junior natural resource companies which is incorporated into the security's price; ii) to determine if the market assigns the trades of different types of insiders different levels of informational value through different price reactions; iii) to determine if the price reaction differs for insider sales and purchases; iv) to determine the correlation between transaction size and price reaction; v) to determine if information regarding the trade is available to the market prior to its official disclosure.

Data: The dataset used in this paper is based on insider trading records for 31,047 transactions in 313 junior natural resource companies between January 1st, 2002 and December 31st, 2006 which were traded on the Venture Exchange of the Toronto Stock Exchange. The insider trading records was obtained from the System for Electronic Disclosure by Insiders (SEDI), and share price data from DataStream.

Methodology: This paper uses an event study for a 21 day window from -5 to +15 days bracketing a transaction and analyzes the abnormal prices and volumes occurring as a result of the transaction.

Results: The market does assign informational value to insider trades at different levels for different categories of insiders at a statistically significant level, with an average cumulative abnormal return of 1.73% for purchases and -3.33% for sales. These trades also cause statistically significant cumulative abnormal volume of 1.84% and 1.82% for purchases and sales respectively. Though no correlation was found between the size of the trade and the degree of market reaction, information leakage does occur, as abnormal returns and volumes begin to occur prior to the official release of the trade information.

Key Terms: Insider trading, junior natural resource, event study, cumulative abnormal return, cumulative abnormal volume.

ACKNOWLEDGEMENTS

I would like to thank my family for their constructive criticism, and specifically my Dad who was able to share his deep knowledge of the junior natural resource industry, and provide guidance in seeking information. I would also like to thank Professor Matti Keloharju of the Helsinki School of Economics for his help in selecting the topic for the thesis. Last but not least, I owe a great deal of gratitude to my computer programming experts Martti Paatela of the Helsinki School of Economics, and Andy Zhang of the University of Waterloo, Canada who assisted me with the creation of the computer model with which the event study was completed. Without them I would have spent innumerable hours creating it on my own.

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1.1 General Introduction

Insiders have a unique insight into the future prospects of a company's business. From time to time some take advantage of this through well timed share purchases and sales. By definition, insiders are senior officers, directors, and major shareholders of listed companies[1]. The stock trades executed by insiders may very well signal a material change in a company's future prospects.

Many studies have examined the profitability of insider trading, the fairness to the average investor, or the degree to which undisclosed information is abused. These studies have largely focused on the US, or major European markets, leaving the Canadian securities market relatively less scrutinised. Canada presents an interesting market to study the effects of insider trading, as regulators have been known to be much less intensive in their enforcement of securities laws[2]. However, the Ontario Court of Appeals overturn of Andrew Rankin's insider trading convictions[3] on November 9th, 2006, has lead some to expect future enforcement to be stricter. New laws and a registry system controlling the availability and timing of insider disclosure have recently been implemented. Regulation of the securities markets is a provincial responsibility and despite many efforts over the years to create a national regulatory body, all such attempts have floundered on the unwillingness of the 10 provinces or the federal government (which also governs over the three territories) to cede control.

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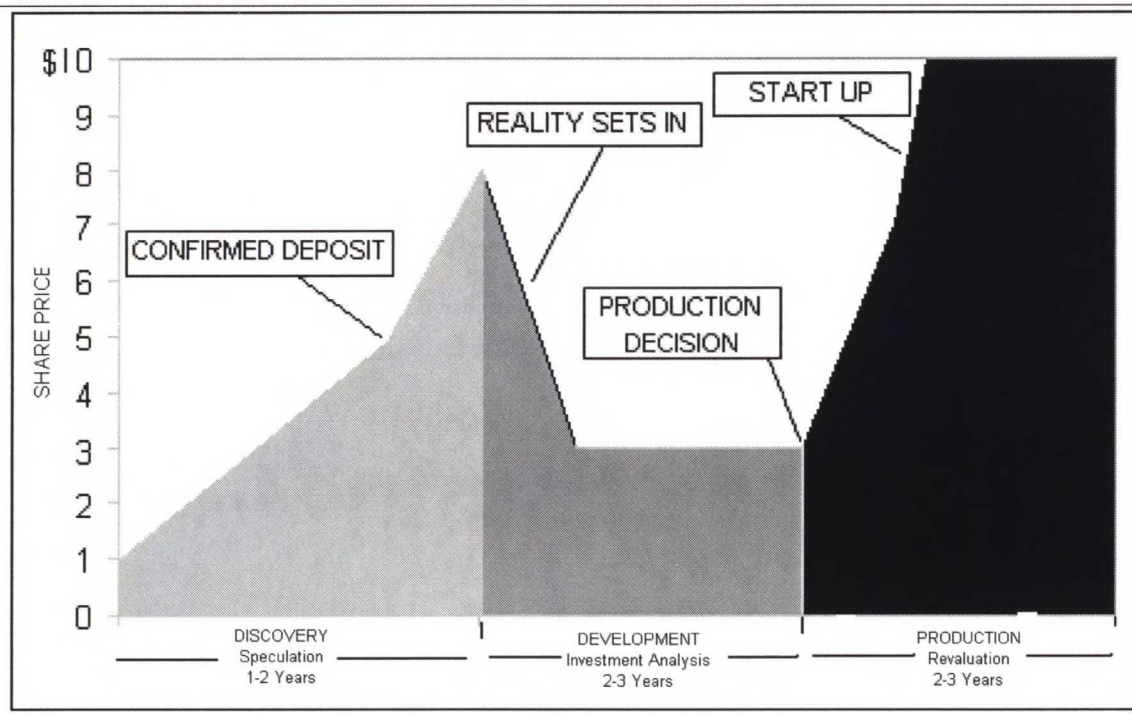
[1] See Appendix 1: Definition of an Insider According to the Securities Act of Ontario
[2] Jackson 2006; McNally and Smith 2003, Globe and Mail November 15th, 2006
[3] Calgary Sun November 11th, 2006

1.2 Canadian Marketplace

A sector of the Canadian capital markets that is particularly remunerative for insider trading is the natural resource market. Specifically, the junior natural resources market as these early stage mining exploration companies offer the greatest volatility and highest potential returns of the natural resources firms, as can be seen in Figure 1 in the "discovery" section where upon successful discovery a stock can increase many times in value. It is in this stage of a company's existence when the potential for information asymmetry between informed insiders and outsiders is the greatest, and when the trading patterns of insiders may reveal new information to the markets.

Figure 1: The Life Cycle of a Mining Share

The Lifecycle of an exploration and development company is highly rewarding in the early stages as shown in the lifecycle chart below. To be a successful investor in these sectors, a high degree of technical expertise is invaluable in determining whether or not a discovery is commercially valuable.
Reproduced from: "The Gold Book", Pierre Lassonde, 1992



The securities markets in Canada are tailored to the sector, which is why, in part it is the premier exchange for the exploration and development for resource stocks in the world, The Toronto Stock Exchange and the TSX Venture Exchange have been so successful in financing these junior companies, that they have become a proxy for US investors and for many other investors around the world. For example the United States has unduly burdensome regulations and many that are inappropriate for the mining and oil and gas industry,

particularly for early stage exploration companies. Only the AIM[4] in the UK has tried to provide a competitive trading platform, with growing results, as the technical expertise, depth of market and infrastructure in Toronto exceeds that of any other market in the world for this sector. It could also be argued that the Australian Stock Exchange would be an appropriate market for this study, but due to its different trading regulations and listing requirements, it does not fulfil the criteria of this study as well as the Venture Exchange, and as Table 1 shows, Toronto has by far the greatest number of listed mining companies from which to choose for this study.

Table 1: Listed Companies and Financing by Exchange

In terms of global market share, as of December 31st, 2006 the TSX and TSX-V collectively list the vast majority of all mining firms in the world, and over 40% of all mining financing occurred on the Toronto markets for 2005. All figures are in millions of US dollars, with N/A indicating that the data was not available for the Amex and JSE exchanges. Note that the number of listed companies quoted here represents all mining companies, i.e. from multibillion dollar senior producers through to microcap juniors. The exchange abbreviations below are: ASX: Australian Stock Exchange, LSE-AIM: London Stock Exchange Alternative Market, Amex: American Stock Exchange, JSE: Johannesburg Stock Exchange, NYSE: New York Stock Exchange.
Source: TSX "A Global Resource for Capital"

TSX & TSX Venture	ASX	LSE-AIM	Amex	JSE	NYSE
1274	543	222	60	52	45
US$ 4,000	US$ 654	US$1,700	N/A	N/A	US$ 41

Given the institutionalisation of the Canadian capital markets over the last few decades, interest in corporate governance and ensuring integrity of the marketplace is central to such sophisticated investors to ensure their investments are not jeopardized by a lax regulatory environment and poor corporate governance practices by managements and Boards of Directors. Since inception, there have been very few prosecutions under the various securities laws in Canada, especially compared to the level of enforcement in, for example, the United States by the Securities and Exchange Commission[5]. Pension funds are becoming more vociferous in their concerns and don't hesitate to voice them publicly and through shareholder votes. As of April 2007, the Ontario Teacher's Pension Fund is in the process of launching a $32 billion privatization bid for Bell Canada Enterprises, (a blue chip company) to increase

[4] The AIM is the London Stock Exchange's listing for companies that are small start ups offering a market with a pragmatic and appropriate approach to regulation to ease access to capital.

[5] *"In certain areas, the evidence is quite clear that Canadian enforcement activity is less intensive than U.S. enforcement activity....private enforcement (both arbitration and class action litigation) is much less common in Canada than in the United States. Criminal prosecutions also appear to be much less common"* –Jackson 2006

shareholder returns as they have been quite dissatisfied with its performance over the past 5 to 10 years[6]. This proactive approach will also continue with regard to corporate governance.

The junior natural resource industry in Canada is known for being a tightly knit community which facilitates the dissemination of information quickly; be it rumours, or facts. Bearing all of the above in mind, it calls into question, how long after an insider completes a trade is that information be kept secret so that the markets could not react to it and incorporate it into the security's price. Also, is that information something that the markets would give any signal value to in the first place? Insiders of such companies are highly courted by investors to gain a unique insight into what recent or future activities might mean from a commercial point-of-view.

1.3 Current Commodities Market

The period from 2002-2006 witnessed the rise of a broad spectrum of commodity prices which also coincides with the time frame since the new insider laws have been introduced. From the early 2000's when gold and other traditional hard asset investments bottomed in the face of a very strong economy and low interest rates, commodity prices hit extreme lows, as shown in the prices of gold and silver in Figure 2. At the tail end of the period is the more recent almost parabolic appreciation of commodity prices after a weakening US economy and lax economic policy caused investors to shift their focus back onto hard assets pushing them to highs not seen in decades, especially evident in the current mania surrounding uranium (2001 $8.00/lb. low to 2007 $113/lb.high) and molybdenum stocks.

[6] Financial Times, April 10, 2007

Figure 2: Price Trends of Major Commodities

These graphs illustrate the increasing price trends for gold and silver (which is representative of the price trends for most other minerals) over the period of 2002 to 2006 by basing them to 100 on January 1st, 2002. During this period the prices of these metals have at least doubled, and at some points in time been over three times their original value, which has caused many more mineral properties to become economically feasible, and has caused renewed interest in the sector as a whole. There has been a significant increase in the activity in searching for prospective properties as well, as firms aim to cash in on this booming market sector.

In Canada, the rapid increase in raw materials prices has led to a wave of new junior natural resource companies which have been created to exploit well known deposits and to explore potential new mineral deposits. Rising prices have made many previously uneconomic deposits viable at these high prices. This has created a market rich with listed companies on the Toronto Stock Exchange, (TSX, formerly TSE) focused on the exploration and development of mineral deposits, which has translated into the listing of 47[7] new mining companies on the TSX Venture exchange in 2006 alone.

1.4 Focus

The focus of this study is insider trading in the shares of junior natural resource companies listed on the Toronto Stock Exchange. Specifically, what effect do transactions of an insider

[7] TSX "A Global Resource for Capital"

have in terms of share impact, over what duration, and with what associated volume? In addition, how long does it take following an insider transaction for that information to become incorporated into a junior natural resource company's share price?

The remainder of this study is divided into six chapters. In Chapter Two an overview the theory behind this thesis is presented. Chapter Three describes different approaches and theories used by other researchers in solving this issue. Chapter Four presents the methodology that is applied to the data collected in order to obtain the results. Chapter Five, reports the findings obtained, and provides an explanation of the meaning of the results. Finally Chapter Six summarizes the study's key findings.

2 Theoretical Background

2.1 Company Structure

Junior natural resource (JNR) companies, particularly those in mineral exploration and development should provide an excellent set of companies from which to measure the effect of insider trades. Typically, a JNR has only one core asset, which is their mineral exploration property portfolio[8]. JNR's create wealth by exploring and developing their portfolio of mineral properties. This is accomplished by prioritizing properties on the basis of completing geological surveys, researching the history of the area's previous mineral deposit discoveries and ultimately by drilling the property. Hence, value creation for the company comes from the discovery of a mineralized structure on their property, which is proved to be an economically viable and exploitable deposit. Though much about a property's geological potential can be determined prior to any drilling, the value a market assigns to such a property is driven mainly by drill results which provide concrete demonstrable evidence of the nature and extent of the mineralization. As a JNR completes successive drill holes, they are required to publish press releases which contain their findings. The JNR's share price quickly incorporates an economic or speculative view of these results. Early stage exploration investments are highly risky. The properties are often in remote areas, which are difficult and expensive to explore. If they are near towns or cities, residents may well object to their commercialization. Furthermore, failure to find economically viable mineral deposits is common and can be due to a host of issues ranging from complex metallurgical issues, to ore body faulting, poor ground conditions or lawsuits.

Most JNRs do not find economically viable mineral deposits and typically go on to find new projects. Their share prices fall drastically (should a speculative rise have been registered in their share price during a recent exploration program), or at best, remain dormant. However, for those that do go on to successfully find an ore body, estimated at perhaps 1 in every 3,000 properties assessed[9], their stock prices can easily increase to multiple times their pre-discovery values within very short timeframes measured in weeks or months at the outside.

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[8] It is rare for a JNR to have only one property as it is usually considered to be too risky. They typically have at least one other "home run" in the works.

[9] A general rule of thumb followed by industry professionals

The risk/reward feature embodied in these securities is a "lottery ticket" like economic outcome for investors along with the potential for extreme volatility. Investors either win big or loose most of their invested capital (not withstanding possible tax offsets). Figure 3 gives an example of one well known firm which found a large deposit of gold and experienced an extremely sharp appreciation in its share price in a short period of time.

Figure 3: A Lottery Ticket Type Firm in Practice

As an example of the "lottery ticket" nature of JNRs, we can take Aurelian Resources Inc. (ARU). At the beginning of 2005, the share price of ARU was $0.74, though by December 29, 2006, ARU's share price had increased enormously to $31.00, after having reached prices over $40 per share a few months before. All of this increase came as a result of successive releases of some extremely promising drill results obtained from their main property in Ecuador. Though the company needs to gather more information from drilling to be able to confirm the size of the deposit, it has been speculated that it could be one of the largest in the world.

It is exactly this "lottery ticket" nature of JNRs that makes them an attractive subset of securities to study. Since insiders are typically considered to be better informed than the average investor, any transactions they complete would most likely be viewed as strong indications of the potential of the company's mineral property, and therefore its future stock price. This paper seeks to identify exactly to what degree the market will react to any insider's transactions by completing cumulative abnormal return studies pre and post each trade.

"Street gossip[10]" in the industry could also occur with relative ease due to the channels of communication and the aforementioned tightly knit community that forms the industry. Most managers of these companies are active in multiple JNRs at one and the same time. The same is true for directors, who often share their time between several ventures. This is done because at any given time one of the companies may be "dormant" or waiting for results, licences, studies, etc to be completed while another company may be active. This allows a manager to efficiently use their time by having very little in the way of idle periods that would otherwise occur when working with just one company. It is also done to hedge the risks to a manager that any single company fails to find an economic ore body. If at least one of their several companies is successful it can be more than offset in the disappointments from the other companies in the meantime. This would not be possible if they were operating only one company. However, this also means that there are comparatively few people active in the industry which creates an environment where most managers are familiar with one another, and aware of the development and current state of other JNRs. Consequently, this creates personal relationships and channels of communication through which "street gossip" can be disseminated quickly and effectively.

2.2 Ontario Law Governing Securities

The Securities Act *(Ontario)* ("OSA") provides the legal framework that governs securities listed, traded, and distributed in Ontario, as this is a matter that falls under provincial jurisdiction. Prior to December 14th, 1999 an insider of a company registered in Ontario was required to file any insider securities trades within 30 days of the end of the month during which the transaction took place allowing up to 40 days to pass after the transaction prior to the trade becoming publicly available information. However, on December 14th, 1999 [11] those laws changed, and since then according to the OSA, an insider[12] of a company must file a record of their transaction within 10 days of having made said transaction[13].

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[10] In terms of this thesis, street gossip is defined as any the spread of non-public rumors or facts concerning the company or any related developments, such as trading activity of insiders.

[11] Under amendment Re-en.1999,c.9,s.214 commenced by Royal Assent on December 14th, 1999

[12] Refer to appendix 7.1 Definition of an Insider According to the Securities Act of Ontario.

[13] According to amendment Re-en.1999,c.9,s.214 under the OSA, which governs trade on the TSX, an insider of a company is required to report trades to the Ontario Securities Commission within 10 days of the trade (OSA, Section 107(2)).

Another change which occurred in May 2003[14] was the creation of the System for Electronic Disclosure by Insiders ("SEDI") which is the database in which all insider activity is listed and is accessible on the internet by the general public. All data is immediately registered there, and has eased the accessibility of such data to the average investor immensely and at no cost to the investor to access such data.

These laws leave a period of time between the moment of the trade and the actual public disclosure of that information which presents an interesting point to study. Theoretically, in accordance with the Efficient Market Hypothesis[15], there should be no anomalous price changes resulting from the insider transaction during this period. It should be in the days following the public disclosure on SEDI that any abnormal price changes occur, and this thesis aims to determine if this holds true in practice.

In the realm of JNRs a long standing unofficial strategy used by investors is to buy on rumours and sell on news. This gives some insight into the psychology of that market's participants, as it suggests there are leaks of information in the form of "street gossip" that allow those closest to the company (without officially being listed as insiders) to change the level of their holdings in response to their view of a company's prospects. This should become even more evident with an insider's trades, as they may also be able to distinguish between what is economically relevant to the company's future prospects as compared to any insider's personal objectives, such as tax planning, need for cash to take advantage of other investment opportunities, estate planning and diversification, etc. If so, then what is the size of this effect?

2.3 Determining who is Important

An efficient JNR requires that much of the available financial resources be devoted to the exploration of their properties. In some cases up to 80% of funds raised are used for exploration and development activities. This is possible as they are most often run by a minimum of staff to minimize their cash burn rate, and use specialized services, including drilling by contracting out to third parties. In some cases this means that there are no more than a total of 10 employees including any ancillary staff. As a result of this need to keep

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[14] According to SEDI website
[15] For more information on the efficient market hypothesis see Fama (1970)

staff levels to a minimum and ensure the utmost flexibility and efficiency, the roles of employees may be wide-ranging, with their exact titles not representative of their complete array of duties. In such a company, one could begin to question the significance of the seniority of different levels of staff. Might it mean that the impact of any insider trades completed is the same for a senior officer, as someone of a lower official rank?

As is human nature, self-interest should be the sharpest spur for change, and therefore I hypothesize that investors would still most likely regard the trades of higher level staff (who are typically the largest shareholders and the best informed as to the company's potential) as a greater signal than those of other levels regardless of the actual number of employees active in a company. In order to shed light on this issue, I intend to differentiate between the classes of insiders to determine what, if any differences occur. This hypothesis is supported by Seyhun (1985) who concluded that higher level insiders trade on more valuable information, and therefore, are able to earn greater abnormal returns.

2.4 The Outside Insider

As stated before, according to Canadian law, an insider can be a shareholder who holds more than 10% of the company's stock. That raises the question, as to what may happen with an individual who holds 9.9% and for all intents and purposes is as good as an insider but is not legally required to report any shareholdings. This relates to the structure of the company's ownership base. Specifically, are there enough other market participants interested in a particular JNR's stock for those large shareholders to be able to dispose of their shares without causing an over supply, and therefore, a significant price drop? Although theoretically, such a 9.9% owner could easily manipulate the market and earn large abnormal profits, I intend to investigate whether it is actually practicable for a 9.9% holder to make a quick exit in these sometimes highly illiquid stocks. This is important when considering trading in JNRs as oftentimes their financings come from large institutional investors who purchase shares through underwritings. Many of those investors end up holding a large portion of the company's equity as either they cannot sell or they continue to accumulate stock in the open market to support the share price. In order to determine the ease with which such a shareholder is able to liquidate their position, I intend to complete a test of liquidity for the stocks selected which will be explained in detail in the methodology section.

2.5 Sources of Information & the Real Insider

One might wonder exactly when the leakage of information occurs that may spur an insider trade. At a typical exploration property that is currently being drilled, the contracted drilling crew's members usually have nearby access to satellite phones, radio communications, cell phones, land line telephones and/or computers, and are known to trade the security of the exploration company based on the drill core samples that they view as it is being taken out for assaying before even the company sees it. This information could then trickle down through informal information channels to members of their family, friends, etc. who might then also complete a trade based on that same information. There are also the assay laboratories involved which complete the actual processing of the core to determine its mineral content. These people have a definitive view of the richness of the core sample and have also been known to trade based on this information. Although, such a blatant misuse of information would result in not only a financial penalty and possible jail time, anyone caught under these circumstances, would become permanently unemployable in the industry. The seriousness of such penalties means that any trading that occurs from the above mentioned types of information channels would be very difficult to measure directly due to those investors paying particular attention to making trades as anonymously as possible.

2.6 Ownership Base and Signal Interpretation

It is postulated that a determinant of some of the price reaction severity is related to the structure of the ownership base. That is, a stock with a large number of small retail investors who are speculators may be more likely to experience more exaggerated returns than one which consists of sophisticated institutional investors who hold larger blocks of shares. Their different reactions could be due to speculators being frightened more easily and thus loosing confidence in the company's value, or it may even be that they are investing with a short term horizon and want to capitalize on the effect of the insider trade. They also don't usually have to contend with liquidity concerns as their purchases and sales are in significantly lesser amounts than institutions, i.e. thousands of dollars versus millions of dollars. Whereas a stock with a more informed shareholder base may be less likely to react as greatly because of a different interpretation of the insider sale, and view it as a less significant signal to future prices.

Given the clout in the marketplace that an institution carries, they may have a better insight into the motivation behind a transaction, either through close communications with the

company or through their financial intermediaries. This also raises the question of an insider's anonymity in the sale of shares. Trading on the Toronto Stock exchange can be done anonymously at the time of the transaction in order to hide their identity. Others will use multiple brokers to distribute their trades and further obscure where the trading activity lies. As a result, an insider can sell shares under the anonymous name, and no one would knows who they had completed the trade until after its public disclosure. This makes it difficult if not impossible for market participants to know with any degree of certainty with whom they are trading until after the end of the trading session. This means that during trading hours an insider could effectively manipulate the market as they please, though in practice this is highly unlikely.

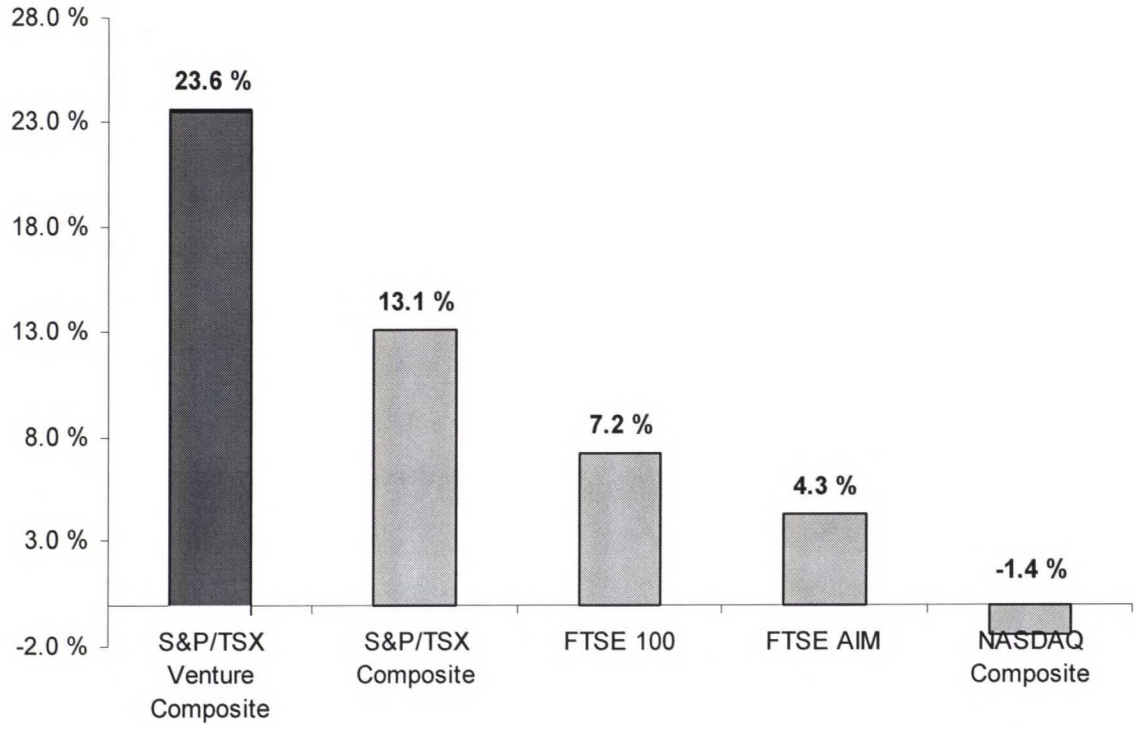
2.7 TSX Venture Exchange

The TSX Venture Exchange was established in mid 2001 as a result of the buyout by the TSX of the CDNX (Vancouver stock exchange) which was known for a high concentration of JNRs. It is a unique marketplace, as its listing requirements allow emerging companies which would not qualify for listing elsewhere eased access to capital and a higher public profile. Because of its unique nature, and Canada's favourable securities laws for the resources industry, it has become a world center for JNRs. A unique feature has come to be offered by the TSX and TSX Venture exchanges as a further result of securities act changes in 2001. This feature is the ability to cloak the identity of a transacting party by trading under the name "anonymous". Normally, all market bids and asks have their associated Participating Organization's names and identity numbers attached. However, any Participating Organization may chose at any time to make a trade under the anonymous name with an identity number 001. This actual identity of an anonymous trade participant remains protected until after settlement, and is available publicly at the end of the trading day from the Central Depository for Securities at 5:05 pm.

The TSX Venture Exchange has also begun to attract increasing attention and capital from investors with the abnormally high returns that it has been able to deliver as a result of a combination its high weighting of natural resource related firms, rising commodities prices, and the highly volatile "lottery ticket" nature of JNRs as was described in subsection 2.1, particularly during the period from 2002 to 2006 for which the true magnitude of these gains can be seen when comparing them to other major international exchanges as in Figure 4.

Figure 4: Market Performance Comparison 2002 to 2006

The true significance of the particularly high growth rate of the TSX Venture Exchange becomes even more apparent when compared to other indices over the years to be studied in this paper. This chart displays the total index return between the years 2002 to 2006 for major international indices. This growth has not gone unnoticed by investors, and has begun to attract capital from other markets and investors who would not traditionally choose to invest in this "unorthodox" industry, which has further compounded the growth rate.
Source: TSX "A Global Resource for Capital"



2.8 Flow-through financing and royalties

Another unique aspect of the Canadian resources market is a tax predicated financing method called flow-through financing. Flow-through financing allows a company to make an investment that is used expressly for the exploration of natural resources. Companies are given a tax credit equal to 100% of the amount of their exploration expenditures on qualified Canadian properties. The tax credit can be used against their taxable Canadian income or sold to third parties by way of equity financings known as flow-through financings. The acquirers of the tax credits can be either corporations or individual investors. The tax credit can be carried back three years, or forward 10 years against taxes paid in those years in order to either recover taxes paid, or to reduce taxes payable in the current year. A second tax credit that is also available is called The Investment Tax Credit for Exploration (ITCE) which allows for special tax credits to be granted on investments made by exploration companies on mining projects located within Canada. The governments of Canada, the provinces and the

territories specifically promote the development of mineral deposits to offset the high risk of failure and to promote economic activity in remote areas of the country.

For example, the Ontario provincial government tax credit amounts to 15% of the invested amount that can also be carried forward or backward identically to the regular flow through financing credit system. The Federal government also has a further credits structured like the ITCE. The amount offered is 5% for a Total of 120% in tax offsets to individual investors available for projects undertaken in Ontario. The amount granted varies from one province or territory to another. Any insider or outside investor may participate in such a flow-through share issuance in the same fashion as any other private placement. Due to their nature, these investments are already in essence, "in the money" at the time of issuance and may therefore cause their holders to have different holding strategies and cause different reactions in the public market.[16]. The effects of this may be visible in the distribution of trade frequency throughout the year, as owners of these shares may wish to sell in December for tax reasons and the purchase of these shares may be highest around March and April in order to create a tax shield. Most importantly, this form of financing is highly likely to play a role I the JNR capital market, as 4,511 of the 8,565 properties[17] owned by mining firms listed on the TSX and TSX Venture Exchanges are located in Canada, and therefore eligible for the flow-through program.

[16] Natural Resources Canada, "The Restructuring of Resource Taxation" and Clark (2004)
[17] As of January 2006. Source: TSX "A Global Resource for Capital"

3 Literature Review

Most previous literature is based on the study of the profitability of insider trading, the fairness to the average investor, or the degree to which undisclosed information is abused. Much of that has been analysed from a legal or economics perspective. However, the studies have largely focused on the US, or major European markets, leaving the Canadian securities market relatively untouched. A few Canadian studies have been produced, some relatively recently. However, all of these studies aimed to determine the effects of insider trading in firms which are already well established, and many are from the perspective of the profitability of trading to the insider. None to my knowledge have ever considered natural resources related junior companies even as a subcategory.

Evidence of insider trading causing abnormal returns is by no means a new body of study. A multitude of research over the course of the past decades has either sought to prove or disprove its occurrence. A large number of these older studies found evidence of insider trading causing short term abnormal returns. These are an extremely relevant set of studies to consider when comparing to the study of JNRs as these researchers have evidence from market conditions that are most comparable to the modern day JNRs. Both current JNRs and past normal stock markets exhibited a lower level of publicly available information, with the daily activities of the companies being much more opaque to the average investor. In both situations, there is a high likelihood of information asymmetry in relation to the market in general. Therefore, the trades of insiders would likely be interpreted as representations of their views on that company's future performance potential.

3.1 Historic Studies

Rogoff (1964) for example, found that the return of insiders of the companies studied in the 6 months following a trade were approximately 9.5% higher than the market. Glass (1966) results concur with this, as he found that they exhibited excess returns of 10% versus the market, when he examined a selection of 8 companies with the highest amount of insider buys to sells over 14 months.

Lorie & Neiderhofffer (1968) approach from a slightly different perspective, by looking at the intensity of buying activity in the companies tested, and find that securities that experience

high levels of insider purchasing in a month, are likely to rise in rise in the following six months. The same characteristics were noted in net selling months by insiders and declines in the share price of the firms. One extremely interesting comment, which is particularly applicable in the context of this study, was that in their paper, Lorie & Neiderhoffer stated that "This study indicates that proper and prompt analysis of data on insider trading can be profitable". In other words there is strong evidence that the information available to insiders did have substantial value. Hence, if the same type of results hold true of JNRs, then investors should profit highly from following the same trade patterns as insiders. A further important observation from Lorie & Neiderhoffer's study is their conclusion, that by the time the information was publicly available that an insider has transacted, there were no further profits to be made from acting on the published data. This strongly suggests that "street gossip" was a factor then, and leaves open the possibility that it could very well still be present in today's JNR marketplace.

A significant study in the realm of event-study analysis, particularly with regards to insider trading, is that of Jaffe (1974). He established a methodology which has been often used by subsequent papers, as it is founded on the principles of the efficient market hypothesis, and is able to efficiently and effectively calculate abnormal returns. For this reason, I will be using his event-study methodology as a base for this thesis as well. However, it is not only his methodology which was significant, as he also found that insiders appear to possess special information, and are able to earn statistically significant abnormal returns based on that information. He also postulated that insiders may participate in gamesmanship trading, or camouflage trading in order to disguise any trades which may in fact hold special information from the market.

Further confirming the idea of insiders possessing special information, Scholes (1972) found in a study of securities prices after secondary offerings, that their prices fall. He attributed this to the issuer possessing inside information of an adverse nature. Scholes also postulated that since information acquisition costs are high, traders of larger blocks of shares should be basing trades on more valuable information than those traders who trade relatively little amounts of shares. Their trades are more likely to be attributable to, for example, portfolio adjustment. As a result, there should be a correlation between the size of the cumulative abnormal returns (CAR) observed, and the size of the transaction. I intend to test the

applicability of this correlation coefficient, which will be described later in the methodology section.

All of these cases provide strong evidence, that in a time when the markets were not in possession of as clear a picture of the company, insiders were viewed as having an ability to better forecast the future price of their firm, and therefore the changes they made in their ownership of the company was interpreted as a signal by the market, which then readjusted the price of the security.

3.2 Canadian Studies

The most recent study and most applicable to this one of Canadian insider trading (Smith & McNally 2003) studied the profitability and timing of the trades completed by insiders before 2000. Their paper reported there is a correlation between insider purchases occurring before good, as well as bad news and insider sales. This gives good reason to believe that the average investor would have noticed this trend and used the insider trade information as a signal of future stock performance. However, this study covered a period in which insider reports were filed under the old laws that only required insider reports to be filed within 10 days of the end of the month in which the trade occurred, potentially leaving a 40 day gap between an insider's trade and public filing. The findings are significant in the context of this study, as it gives cause to believe that investors would consider insider trades as signals of future company performance. The nature of junior natural resource companies may very well amplify this effect, which is discussed in the *company structure* subsection. Although these results show that abnormal returns occur, it does not specify the results per industry and given the changes in the regulations since then, there is an opportunity to determine how this applies here.

Other Canadian studies (Baesel & Stein 1979, Lee & Bishara 1989, and Jabbour, Jalivand & Switzer 2000) have all also proven the existence of positive (negative) abnormal returns when insiders buy (sell) shares. However, the work of Basel & Stein (1979) covers trades made from 1968 to 1972 and focuses on the trades of insiders and bank directors of well established firms. Lee & Bishara (1989) compared insider buys during a bull market (March 1980 to May 1981) versus bear market sells and found that during bear conditions selling aided insiders to avoid abnormal losses. While experiencing bull market conditions, abnormal gains accrue to directors and bank directors.

Jabbour, Jalilvand, & Switzer (2000) approached insider trading from the perspective of trades by insiders before take-over announcements in Canadian take-over target firms from 1985 to 1995. Here again, insider trading as a form of price manipulation was named the culprit for early run up in the stock prices.

Glosten & Milgrom (1985) state that the market makers will suffer expected losses with trading with informed agents. Therefore the presence of insider trading in a stock causes the bid-ask spread to widen so that they may recoup their losses by trading with uniformed market participants. This suggests that trading by insiders should have a negative impact on the price of the stock by lowering its attractiveness to investors, and therefore lower firm value. However, in trading on the Canadian market, anyone can transact under the name anonymous in order to hide their identity. As a result, an insider can sell shares under the anonymous name, and no one would know with whom they had completed the trade until after its public disclosure. This means that the Canadian market makers may be forced to maintain a constant larger bid-ask spread than the natural level since they cannot know at any time which trades will executed by insiders and therefore would be loss making for the market makers, causing the lowered value of the company as a whole.

This also agrees with the theory presented by Jaffe (1974) with regards to insiders participating in gamesmanship trading, or camouflage trading. In practice, when trading, many securities firms will aggregate/disaggregate trades on their own as principals and then cross them in larger/smaller blocks to market participants. This a constant threat to the exchanges and one that has very little information published on it. The very sophisticated institutions also use algorithms to purchase and sell stocks in large liquid companies in an attempt to disguise their trading activities. Programmers are well advanced now on sniffing out such activities. However, this level of sophistication simply does not apply to JNR's given their typically small capitalisations and associated lack of liquidity. Many institutions in the United States are also prohibited under their charters from purchasing shares with a price of less than $5.00. A JNR with a $5 share price is viewed, on a relative basis as being a "blue chip" by that time. This is important, because the U.S. is a significant source of the capital invested into the Canadian securities market, and has an influence in the size of the investor base participating in any given company.

Table 2: Summary Results of Canadian Market Studies

The Chart below provides a brief quantitative summary of the results of the Canadian market based studies that were included in the literature review section above.

Author(s)	Year Published	Period Studied	Observed Result
Smith & McNally	2003 (Working paper)	1987–2000	CAR at day zero for purchases -0.8%, for sales 4.8%. At day 10, CAR for purchases 0.2%, for sales -5.1%
Basel & Stein	1979	1968–1972	Ratio of Buys to sells: 58.7% to 41.3%. CAR after 12 months for buys (sells): Bank directors 7.8% (-6.3%), Ordinary Insiders 3.8% (-4.3%).
Lee & Bishara	1990	March 1980–May 1981	CAR for insider portfolios calculated for a 12 month period. CAR observed for buy portfolios: Directors: 1%, Senior Officers: 2.1%, Bank Directors: 8.1%, Beneficial Owners: 3.4% CAR for insider sell portfolios: Directors: -1.2%, Senior Officers: -1.3%, Bank Directors: -6.2%, Beneficial Owners: -5.2%
Jabbour, Jalivand & Switzer	2000	1985–1995	Cumulative abnormal returns after 25 days for net purchasers: 13.83%, for net sellers: -20.76%

3.3 More Recent American Literature

Trueman (1983) states that the fact that a manager is allowed to trade his stock suggests he may be withholding information for his own benefit and financial gain. In the context of this study, this may very well imply that the trades completed by managers in their own shares could be interpreted as an even greater signal to outside investors than according to other theories. This implies that not only may an insider be better informed, but that they may use that information in a manner that is malicious to shareholder value.

This agrees with a study completed by Meulbroek (1992) into insider trading that reveals insider trading (though it may be completed in complete anonymity) is detected, and that the market responds to trade-specific characteristics and incorporates private information. Though this was based on a range of industries in the US market, it could also be applicable here, as the tightly knit nature of JNRs lends itself well to the spread of information through

informal channels (i.e. street gossip). Particularly in detecting large block trades which are usually associated with insiders, and could be detected by the market as such.

The findings of Masson & Madhavan (1991) support the concept that insider trading lowers firm value, but they also find that greater executive stock ownership raises the value. Their model was based on assuming inseparability factors, and that compensation, ownership and trading issues should be considered simultaneously in determining the significance of a trade. In a JNR executives are often given a large portion of their compensation in the form of options, warrants or shares as incentives to build value. Occasionally this may result in insiders holding extremely significant ownership positions of the company[18]. Theoretically, the findings of Masson & Madhavan (1991) should also hold true for JNRs, and in order to accurately quantify if they do, I will account for the size of insider trades as a proportion of their ownership, which will be discussed in the *Methodology* section. I firmly believe that this theory is applicable to JNRs because large stock ownership by management will most likely be seen as beneficial when potential investors are considering a company. This would make access to capital markets easier for these companies, which due to their size and the riskiness of their business, may otherwise find it nigh on impossible to find willing investors, or capital available at a reasonable price.

Keown, Pinkerton, & Bolster (1992) study asymmetrical information's effects on trading volume in merger announcements. Though they consider only the effect on volume, and not on share price. They find that abnormal volume occurs prior to the announcement dates of either rumours or official press releases confirming a merger. This lends further confirmation to the theory of "street gossip" being a possible reality, and also offers a good model for abnormal volume measurement which will be discussed later in the methodology section.

[18] Consider Aurelian and Liner Gold (both traded on the TSX Venture exchange). Both were nearly 50% owned by insiders from the time of their inception through to their major discoveries of mineralization.

4 Methodology

4.1 Sample Data

The companies selected for this study were "active" mineral exploration companies between January 1st, 2002 and December 31st 2006 listed on the TSX Venture exchange. Companies were determined to be "active" if they had issued press releases of drill results at least once during the time period studied and their "Industry Group" was listed by SEDAR[19] as being "Junior Natural Resource – Mining". Only companies which were exclusively involved in mineral exploration with no other major assets or revenue streams were allowed[20]. As is the nature of the industry, once a JNR has discovered an economically feasible mineral deposit, they are often bought out by a major mining company which then puts the mine into production. As a result, not all of the companies studied necessarily existed for the entire length of the period used.

SEDI provides a registry of all transactions insiders make. In addition to outright purchases, sales of shares on the open market it also contains transfers of shares between an insider's own accounts and all derivative based activities. This includes the grant of shares, as well as grant, exercise, and expiration of warrants and/or options. From these available registered transactions, I will use only those which involve a transaction of money for securities. Hence, of the indirect transactions (i.e., those which do not consist of open market trades with other participants) the exercise of options/warrants will be counted in the purchases category, and the remainder will not be included. The reason is that, except for the aforementioned transaction types, none of the remainder involves the investment or divestment of personal wealth in the company (such as a transfer of shares from one account belonging to an insider to another trading account held by the same individual).

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[19] SEDAR is the System for Electronic Document Analysis and Retrieval is a Canadian Securities Administrators run publicly accessible database into which all companies listed on a public exchange in Canada are legally required to file all press releases and regulated information.

[20] This is an important step, as some of the JNR companies may also be involved in oil & gas activities that in some instances meant they were active microscale (less than 100 barrels of oil equivalent per day) producing operations. This meant they had some kind of revenue stream, and may no longer have possessed the "lottery ticket" type of characteristics that are a core theme of the companies intended to be examined by this study.

Although the award of options or shares may be seen as a positive method of rewarding a successful executive, I argue that it does not imply that that executive has any particular views regarding the future of the company; rather it is simply a method of granting compensation for work completed or as an incentive to retain his services in the face of a very severe shortage of management personnel. Furthermore, including the grant of options or shares in the study would not be correct, as any such grants are announced publicly in a press release prior to their actual occurrence. Therefore, any information contained in this grant would already be incorporated into the price of the share well before the grant date. Such transactions should therefore not have any abnormal volume or returns associated with them, and thus as "non-event" transactions their abnormal volume or returns results would create an incorrect measurement in the abnormal volume or returns for potentially information possessing insider trades.

4.2 Abnormal Returns Formulae

The CAR for this study will be counted for the period of τ=-5 days prior to an insider's trade, up to τ=+15 days post trade. This is necessary since it allows us to observe the any changes in the share's price before the transaction (such as run-ups, run-downs etc.), and also during the period after the transaction has occurred but before it becomes publicly disclosed, as well as after it is disclosed to the general public on SEDI. The CAR will be calculated using the following formula which is constructed on the market-adjusted model of Jaffe (1974):

$$CAR_{it} = \sum_{\tau=-T}^{t} R_{i\tau} - (\alpha + R_{m\tau}) \qquad (1)$$

Where:

$R_{m\tau}$ is computed using the market return of the S&P/TSX Venture exchange index.

The result of (1) represents the difference of the measured return of the security and the measured return of the market. This difference between the two parts of the equation is the abnormal return on the security, which is attributable to the influence of the trades completed by an insider's transaction on the stock.

I will also analyse which corporate position has the greatest effect on the price of the company. This will be divided into: senior officers, outside directors, large shareholders, and other insider(s). SEDI divides insiders according to a different set of categories, which have been sorted to fit into those which I will use. The original SEDI categories and my equivalents can be found below in Table 3.

Table 3: Equivalents of SEDI's Insider's Relationship to Issuer

The official SEDI categories for insiders which are used in the source information for this study and are found on the SEDI online database are presented in the right hand side column with my equivalent categories shown on the left hand side of the table. The categories relating to Other insiders have been bundled together as all subsidiaries related categories will be used very infrequently, as JNRs very rarely have subsidiaries.

Insider's Relationship to Issuer Equivalent Used in This Study	Insider Categories According to SEDI Database
Other insider(s)	1 – Issuer
Other insider(s)	2 - Subsidiary of Issuer
Large Shareholder	3 - 10% Security Holder of Issuer
Director of Issuer	4 - Director of Issuer
Senior Officer	5 - Senior Officer of Issuer
Large Shareholder	6 - Director or Senior Officer of 10% Security Holder
Other insider(s)	7 - Director or Senior Officer of Insider or Subsidiary of Issuer (other than in 4,5,6)
Other insider(s)	8 - Deemed Insider - 6 Months before becoming Insider

4.3 Abnormal Volume Formulae

In order to better understand the price reactions that are taking place surrounding the trades by insiders, I also complete an analysis of the abnormal volume that occurs. The structure of this analysis is based on that of Keown, Pinkerton & Bolster (1992) and is much like that of the abnormal returns analysis of Jaffe (1974). It will be counted for the same event window of τ= -5 days prior to an insider's trade, up to τ=+15 days post trade and using the formula for cumulative abnormal volume (CAV):

$$CAV_{it} = \sum_{\tau=-T}^{t} V_{i\tau} - (\alpha + V_{m\tau}) \qquad (2)$$

Where:

$V_{m\tau}$ is computed using the percentage of the total number of shares issued and outstanding on the TSX-V that are traded during each day.

V_{it} is calculated as the percentage of total amount of the company's shares issued and outstanding that are traded on each day.

The result of (2) represents the difference between the trade volume of the market overall versus the security for which the calculation is made. Any statistically significant deviation from zero is attributable to trading activity surrounding the trades completed by an insider's transaction.

4.4 Statistical Analysis Formulae & Other Calculations

In accordance with the concept of Masson & Madhavan (1991), and Scholes (1972) I also intend to examine the correlation between the cumulative abnormal returns generated, and would have liked to compare it to the size of the trade completed in proportion to the holdings of the insider. Ideally, this would be completed by determining a correlation coefficient between the amount of stock traded (as a percentage of the insider's holdings) in relation to the size of the abnormal returns occurring after that trade. However, SEDI's data for total insider holdings was incomplete, and this could not be used as a basis for comparison. In its stead, I have decided to use a proxy of this proportion, by comparing the number of shares traded to the number of the company's shares outstanding. Though this does not perfectly capture the picture of the trade's relationship to the insider's position as originally intended, it gives us a good glimpse of the magnitude of each trade. By comparing the trade in this manner, we benefit by being able to compare the actual size of the trades completed by insiders in relation to other categories of insiders and get a better view of which category trades the largest proportion of the company's shares. The correlation coefficient will be calculated using equation (3).

Hence:

$$\rho_{x,r} = \frac{E((x-\mu_x)(r-\mu_r))}{\sigma_x \sigma_r} \tag{3}$$

Where X is $\frac{Shares\ traded}{number\ of\ shares\ issued}$, and r is the cumulative abnormal return resulting from the shares sold.

For example, it would seem reasonable to think that the sale of 0.1% of the company's outstanding shares by an executive would cause less abnormal returns than if they were to dispose of 1% of the company's shares. The size of the trade would also be expected to correlate to the significance of the information on which the trade is made; hence the smallest trades are most likely to be portfolio rebalancing, while trades towards the other end of the

size spectrum are most likely to contain information related to the future potential of the firm, as proposed by Jaffe (1974). Therefore, the significance of the size of the trade should be reflected in the size of the market reaction to that trade, resulting in a correlation.

It also follows logically, that if insider trading increases the accuracy of securities prices, they abnormal returns occurring on days of trades by insiders should have the same sign (either positive or negative) as the day on which that insider trade becomes public information. Hence, this should cause a move towards a price level that reflects the information's incorporation into the stock's price.

The stock price data of each company has been acquired from DataStream, and the insider trading files have been acquired from SEDI. SEDI is the electronic registry of all insider trades for Canadian securities.

In order to determine the ease with which a theoretical 9.9% stakeholder could liquidate their position, I intend to measure the percentage of the company's shares that are traded between day 0 and +10. This will be completed by summing the volume of shares traded during those days, and subtracting the insider trade's traded share amount from that sum.

To test if the results on insider trading days are significantly different from zero, I will use two tests. First, the t-test to see if the daily and cumulative abnormal returns and volumes differ from zero, using the cross-sectional standard error calculated from the abnormal returns. Its equation is as follows:

$$t = \frac{\bar{x} - \mu}{std.\ error} \tag{4}$$

Where:

Standard error is represented by the formula:

$$\text{Standard error} = \frac{\sigma}{\sqrt{n}} \tag{5}$$

Secondly, the z-statistic tests to see if the mean cumulative abnormal return on insider trading days differs from zero. The Z statistic is a cumulative standard prediction error (CPSE). Its equation is shown below:

$$Z - stat = \frac{1}{\sqrt{K}} \sum_{i=1}^{K} \frac{\hat{\delta}_i}{s_i} \tag{6}$$

Where:

$\hat{\delta}_i$ is the variance of the portfolio
K is the number of insider trading events
s_i is the standard error of the estimated coefficient $\hat{\delta}_i$ represented by:

$$s_{i,t} = s_i \left[1 + \frac{1}{L_i} + \frac{(R_{m,t} - \overline{R}_m)^2}{\sum_{t=1}^{L_i} (R_{m,t} - \overline{R}_m)^2} \right]^{1/2} \tag{7}$$

Where:

L_i is the estimation period in days
$R_{m,t}$ is the return on the market
R_m is the return on the security
S_i is the standard error over the entire period

The Z statistic is used because it captures some information that the t-statistic may miss since it weighs the individual coefficients by their preciseness. The Z statistic's incorporation of the individual $\hat{\delta}_i$ coefficients is important in considering the mean insider trading CAR because the magnitude of the CAR may not be evenly distributed over the course of the period in which cumulative abnormal returns are calculated. For example, an episode of 10% CAR accumulating evenly over the course of the entire period would not be as unusual as if it were to have that same 10%, but with 9% of that occurring in one day[21].

[21] For further information on the Z statistic, please refer to Warner, Watts, & Wruck (1988) as well as Dodd and Warner (1983)

5 Results and Discussion

Disclosing issuers were filtered in SEDAR according to the criteria explained in the methodology section, and 320 matching companies were found. Of these, 6 companies were rejected, as they owned properties related to oil and gas exploration in addition to a main portfolio of mineral mining properties. One additional company was eliminated from the group, as it had just recently been listed, and no insider trading of its securities had yet been registered with SEDI.

For the 313 companies that were accepted to be studied, 31,269 trades were recorded during the period of January 1, 2002 to December 31, 2006. Of those trades, cumulative abnormal returns calculations could only be completed for 31,047. There were 222 trades for which a date of transaction was erroneously recorded as having taken place on a public holiday. The TSX Venture exchange is not open for trade on public holidays, and the correct trade date remained undeterminable. Of the trades for which abnormal returns was calculated, 15,264 were purchases by insiders, while 15,566 were insider sales, resulting in a nearly 50% purchases, and 50% sales split, which is similar to the results obtained by Basel & Stein (1979) of 58.7% and 41.3%. The results are visible in the summary statistics Table 4. Returns for the transactions were volatile with standard deviations of on average 17.53% and 19.84% for purchases and sales respectively, and had CAR values that rose or fell by large amounts from one day to the next, resulting in the extreme high and low values of the maximum and minimum respectively. From Table 4, we can see that the vast majority of all trades (72.26%) were completed by senior officers of the company, followed in a distant second place by large shareholders at 16.03%.

Z-Statistics for this data set do not provide any useful additional information. None of the data was statistically significant and as such the Z-statistics results have been omitted.

The only outcome in this table that was out of line with expectations is the correlation coefficient, which shows that in neither purchases nor sales of shares, are the amount of shares traded related to the size of the cumulative abnormal returns recorded for each transaction, which is explored further in subsection *Low Correlation* of the discussion section.

Table 4: Summary Statistics of Canadian Junior Natural Resources Firms 2002-2006

This table is presents the summary statistics sand results of the event study analysis. The figures for *summary statistics* are drawn from the values on day +15. Hence, they represent the distribution of the final measured day's cumulative abnormal returns results. As a result of the disparity between the number of transactions occurring in each category, these are all weighted values. Under the heading *By Category* is a count of the number of observations for each category of insider, separated for purchases and sales. *CAR to Amount traded Correlation Coefficient* is the coefficient of correlation that was determined to exist between the magnitude of the observed abnormal returns of day +15. Their confidence levels are given here as numbers instead of being marked by stars, to show that not only are these results not within a range of high confidence, but are in fact very far from it.

	Insider Purchases	Insider Sales
Distribution of Final Values on Day +15		
Mean	1.73 %	-3.33 %
Median	1.71 %	-3.51 %
Standard Deviation	17.53 %	19.84 %
95th percentile	27.28 %	30.73 %
5th percentile	-26.82 %	-29.13 %
Minimum value	-45.08 %	-415.57 %
Max value	241.26 %	89.70 %
Total Number of Observations	15,264	15,566
Number of Observations By Category:		
Senior Officer	10,738	11,697
Director of Issuer	1,190	1,375
Large Shareholder	3,141	1,872
Other insider(s)	195	622
Correlation Between CAR and Percentage of Company Traded		
Correlation coefficient	0.01	-0.01
T Statistic	0.74	-1.11
Confidence Level	54.08 %	73.31 %

Table 5: Summary of Trade Volumes

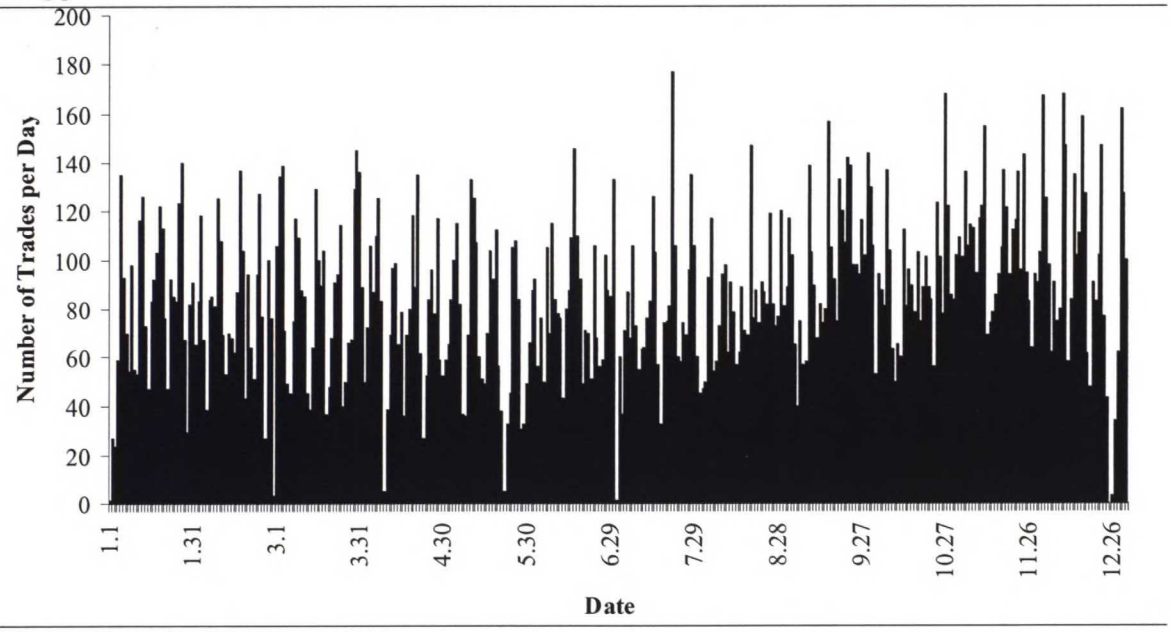
This table outlines figures obtained in relation to the volumes traded by insiders and around the insider transaction date. The percentage proportion of the insider's total holdings of the firm's shares for each category of insider, separated for purchases and sales. The *Average percentage of company's shares traded during 90 days preceding transaction* is the 90 day average of the company's shares traded as a percentage of all outstanding shares prior to the transaction date. The *Average Percentage of Company's Shares Traded Between 0 and* +10 is the average of the total percentage of the company's shares traded during the ten days between the occurrence of the insider transaction, and the official disclosure of the information on SEDI for each category of insider, separated for purchases and sales. *Average percentage of company's shares traded by insider* is the average portion of the company's total outstanding shares traded by the insider in a single transaction for each category of insider, separated for purchases and sales. Confidence levels are indicated with stars as follows: 90%*, 95%**, 99%***

	Insider Purchases		Insider Sales	
Average percentage of company's shares traded during 90 days preceding transaction				
Senior Officer	0.30 %		0.41 %	
Director of Issuer	0.21 %		0.31 %	
Large Shareholder	0.13 %		0.18 %	
Other insider(s)	0.12 %		0.10 %	
Average percentage of company's shares traded between 0 and +10 per day				
Senior Officer	0.36 %	*	0.49 %	**
Director of Issuer	0.24 %	***	0.39 %	***
Large Shareholder	0.17 %	***	0.27 %	***
Other insider(s)	0.18 %	**	0.30 %	***
Average percentage of company's shares traded by insider				
Senior Officer	0.26 %		0.13 %	
Director of Issuer	0.17 %		0.10 %	
Large Shareholder	0.45 %		0.30 %	
Other insider(s)	0.06 %		0.01 %	

From the amount of shares traded between 0 and +10, we can also conclude that a theoretical 9.9% non-reporting stakeholder would not be able to liquidate their entire position prior to the public dissemination of an insider's trade. Such a 9.9% holder could only sell at most 1% to 4% of the company's shares, which is just a fraction of their position. Realistically, even then it would be highly unlikely that they could act as the sole seller on the market, and would probably be able to act as the selling party in only a portion of the trades completed in any given day.

Figure 5: Distribution of Trades on an Annual Basis

This figure illustrates the count of transaction occurrences per day throughout the period studied of 2002-2006. From the relatively even distribution we can interpret that there is very little to no seasonality in the trading patterns of insiders.



In Figure 5, we can see the distribution of the timing of trading. Analysis of the timing of trading completed by insiders shows the seasonality of insider trades is low. There is no particular time of year in which insiders are more likely to be actively trading than any other time of the year. Though we cannot extract information related specifically to the flow-through shares mentioned earlier in section two, we can conclude that overall insiders are not specifically selling or purchasing shares in large quantities for tax purposes at the beginning and end of the year.

Figures 6 and 7 display the CAR results for each transaction date. From them, we can see that on average, for both buys and sells, the CAR was nearly flat during the period from -5 to 0, and was not statistically significantly different from zero. The CAV also followed a similar pattern, as it was on average not statistically significant. The CAR observed from 0 to +10, on the other hand, followed an increasing slope for purchases as Figure 6, and a decreasing slope for sales in Figure 7. The t-test calculations for the CAR on these days showed that on average they were statistically significant, and that they did not constitute points that could have occurred as statistical anomalies. The data recorded for days +10 to +15 showed another spike in CAR as the information regarding the trade was made public, in most curves on day +10, and followed by a decline or levelling out of CAR by day 15. These dates also had daily abnormal volume levels which were significant.

Figure 6: Cumulative Abnormal Returns of Purchases

This figure better illustrates the results for insider purchases shown in Table 6, as it shows the immediate reaction to insider purchases in all insider categories beginning immediately after day 0, along with the run-up before the sales by Directors, and Senior Officers.

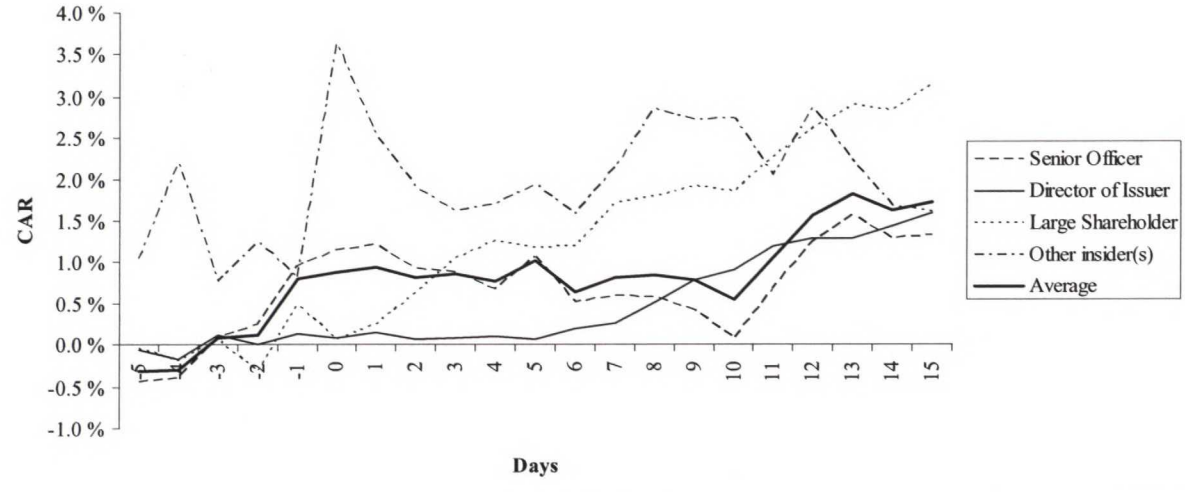
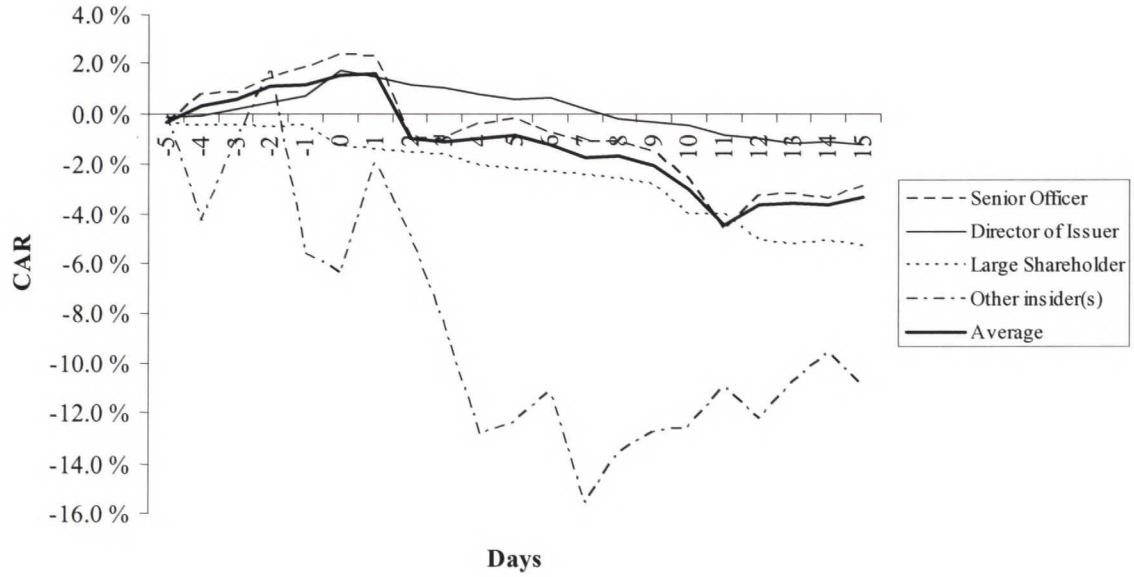


Figure 7: Cumulative Abnormal Returns of Sales

This figure better illustrates the results for insider sales originally in Table 7, as it shows the variable reaction to insider purchases in all insider categories starting on day 0, notably, the particularly sever reaction to sales by other insiders which far out runs the reaction to any other of the insider categories.



Tables 6 to 13 which appear on the following pages display the results for price and volume changes both cumulatively and per day for each category of insider and for purchases and sales separately. From this data, we can conclude that the hypothesis of no abnormal returns is rejected, as statistically significant abnormal returns and volume do occur as a result of insider trading. As the null is rejected, support builds for the hypothesis that the markets do react to insider trading. This implies that insider trading information is not kept confidential until its official release date, meaning that "street gossip" does in fact occur, and that the market regards different categories of insiders to possess information of different values.

Table 6: Cumulative Abnormal Performance of Shares Within -5 and +15 Days of Insider Purchases

This table lists the cumulative abnormal returns for insider purchases occurring up to and including the date measured for each category of insider and for the weighted *average*. These measurements have been taken at each day from 5 days prior to the transaction through 15 days subsequent to the transaction. Underneath each date is the associated T-statistic, and its corresponding significance as noted by stars. Significance is noted as: 90% *, 95% **, 99% ***. The T-Statistic for the *average* is calculated based on the standard error for the entire distribution up to and including the given date.

Day	Senior Officer	Director of Issuer	Large Shareholder	Other insider(s)	**Average**
-5	-0.44 %	-0.05 %	-0.04 %	1.06 %	**-0.31 %**
	-0.60	-0.21	-0.09	1.28	0.63
-4	-0.40 %	-0.17 %	-0.19 %	2.21 %	**-0.31 %**
	-0.54	-0.60	-0.38	2.67 ***	1.49
-3	0.07 %	0.11 %	0.05 %	0.77 %	**0.08 %**
	0.20	0.36	0.09	0.93	0.95
-2	0.24 %	0.00 %	-0.31 %	1.24 %	**0.12 %**
	0.65	0.00	-0.52	1.50	1.05
-1	0.95 %	0.13 %	0.49 %	0.82 %	**0.79 %**
	2.58 **	0.36	0.79	0.99	2.03 **
0	1.15 %	0.09 %	0.06 %	3.63 %	**0.88 %**
	3.10 ***	0.24	0.10	4.41 ***	4.01 ***
1	1.21 %	0.15 %	0.24 %	2.54 %	**0.95 %**
	3.27 ***	0.39	0.37	3.08 ***	3.28 ***
2	0.93 %	0.06 %	0.62 %	1.90 %	**0.81 %**
	2.51 **	0.15	0.92	2.30 **	2.71 ***
3	0.88 %	0.09 %	1.05 %	1.61 %	**0.86 %**
	2.37 **	0.22	1.54	1.95 *	2.76 ***
4	0.68 %	0.11 %	1.25 %	1.71 %	**0.77 %**
	1.83 *	0.26	1.79 *	2.07 **	2.81 ***
5	1.06 %	0.06 %	1.18 %	1.93 %	**1.02 %**
	2.87 ***	0.16	1.65 *	2.34 **	3.11 ***
6	0.51 %	0.19 %	1.19 %	1.58 %	**0.64 %**
	1.37	0.47	1.65 *	1.91 *	2.51 **
7	0.59 %	0.26 %	1.71 %	2.14 %	**0.81 %**
	1.59	0.62	2.34 **	2.59 **	3.35 ***
8	0.57 %	0.51 %	1.79 %	2.85 %	**0.85 %**
	1.54	1.20	2.42 **	3.46 ***	4.05 ***
9	0.42 %	0.78 %	1.91 %	2.73 %	**0.78 %**
	1.12	1.83 *	2.56 **	3.31 ***	4.08 ***
10	0.07 %	0.90 %	1.86 %	2.74 %	**0.54 %**
	0.19	2.08 **	2.48 **	3.32 ***	3.85 ***
11	0.67 %	1.20 %	2.26 %	2.04 %	**1.06 %**
	1.81 *	2.73 ***	2.98 ***	2.47 **	4.22 ***
12	1.25 %	1.30 %	2.62 %	2.87 %	**1.56 %**
	3.38 ***	2.88 ***	3.40 ***	3.47 ***	5.36 ***
13	1.56 %	1.29 %	2.90 %	2.22 %	**1.82 %**
	4.20 ***	2.75 ***	3.72 ***	2.70 ***	5.15 ***
14	1.30 %	1.43 %	2.83 %	1.67 %	**1.63 %**
	3.50 ***	3.01 ***	3.60 ***	2.02 **	4.62 ***
15	1.33 %	1.59 %	3.15 %	1.61 %	**1.73 %**
	3.58 ***	3.34 ***	4.00 ***	1.96 *	4.90 ***

Table 7: Cumulative Abnormal Performance of Shares Within -5 and +15 Days of Insider Sales

This table lists the cumulative abnormal returns for insider sales occurring up to and including the date measured for each category of insider and for the weighted *average*. These measurements have been taken at each day from 5 days prior to the transaction through 15 days subsequent to the transaction. Underneath each date is the associated T-statistic, and its corresponding significance as noted by stars. Significance is noted as: 90% *, 95% **, 99% ***. The T-Statistic for the *average* is calculated based on the standard error for the entire distribution up to and including the given date.

Day	Senior Officer	Director of Issuer	Large Shareholder	Other insider(s)	**Average**
-5	-0.37 %	-0.16 %	-0.43 %	0.01 %	**-0.35 %**
	-0.55	-0.68	-0.72	0.01	-1.75 *
-4	0.73 %	-0.05 %	-0.47 %	-4.26 %	**0.32 %**
	0.88	-0.17	-0.70	-4.75 ***	1.40
-3	0.84 %	0.18 %	-0.46 %	-1.00 %	**0.55 %**
	0.94	0.57	-0.59	-1.11	2.23 **
-2	1.37 %	0.43 %	-0.53 %	1.69 %	**1.07 %**
	1.44	1.32	-0.63	1.88 *	4.05 ***
-1	1.84 %	0.69 %	-0.48 %	-5.64 %	**1.16 %**
	1.78 *	1.95 *	-0.56	-6.29 ***	4.17 ***
0	2.36 %	1.69 %	-1.32 %	-6.41 %	**1.51 %**
	2.14 **	4.45 ***	-1.39	-7.15 ***	5.05 ***
1	2.27 %	1.45 %	-1.44 %	-1.89 %	**1.58 %**
	1.98 **	3.76 ***	-1.53	-2.11 **	5.22 ***
2	-0.94 %	1.15 %	-1.54 %	-4.91 %	**-0.99 %**
	-0.82	2.91 ***	-1.63	-5.48 ***	-3.23 ***
3	-0.90 %	1.01 %	-1.59 %	-8.52 %	**-1.12 %**
	-0.77	2.50 **	-1.64	-9.50 ***	-3.59 ***
4	-0.41 %	0.73 %	-2.03 %	-12.79 %	**-1.00 %**
	-0.35	1.76 *	-2.06 **	-4.27 ***	-3.15 ***
5	-0.17 %	0.59 %	-2.17 %	-12.37 %	**-0.83 %**
	-0.15	1.37	-2.18 **	-3.80 ***	-2.59 ***
6	-0.77 %	0.64 %	-2.30 %	-11.19 %	**-1.25 %**
	-0.64	1.47	-2.29 **	-3.48 ***	-3.83 ***
7	-1.11 %	0.21 %	-2.42 %	-15.58 %	**-1.73 %**
	-0.92	0.47	-2.41 **	-7.38 ***	-5.28 ***
8	-1.11 %	-0.18 %	-2.56 %	-13.55 %	**-1.70 %**
	-0.90	-0.41	-2.54 **	-5.12 ***	-5.13 ***
9	-1.53 %	-0.31 %	-2.81 %	-12.74 %	**-2.03 %**
	-1.25	-0.68	-2.70 ***	-4.22 ***	-3.04 ***
10	-2.66 %	-0.45 %	-4.01 %	-12.56 %	**-3.02 %**
	-2.13 **	-1.00	-3.80 ***	-4.02 ***	-6.93 ***
11	-4.64 %	-0.87 %	-4.03 %	-10.94 %	**-4.49 %**
	-3.68 ***	-1.90 *	-3.77 ***	-4.21 ***	-3.12 ***
12	-3.28 %	-0.94 %	-5.11 %	-12.22 %	**-3.65 %**
	-2.57 **	-2.05 **	-4.74 ***	-6.64 ***	-5.60 ***
13	-3.20 %	-1.17 %	-5.25 %	-10.80 %	**-3.57 %**
	-2.50 **	-2.53 **	-4.80 ***	-7.05 ***	-6.30 ***
14	-3.41 %	-1.11 %	-5.12 %	-9.58 %	**-3.66 %**
	-2.64 ***	-2.39 **	-4.70 ***	-10.69 ***	-10.51 ***
15	-2.85 %	-1.23 %	-5.33 %	-10.98 %	**-3.33 %**
	-2.21 **	-2.64 **	-4.88 ***	-10.25 ***	-9.56 ***

Table 8: Daily Abnormal Performance of Shares Within -5 and +15 Days of Insider Purchases

This table lists the daily abnormal returns for insider purchases occurring up to and including the date measured for each category of insider and for the weighted *average*. These measurements have been taken at each day from 5 days prior to the transaction through 15 days subsequent to the transaction. Underneath each date is the associated T-statistic, and its corresponding significance as noted by stars. Significance is noted as: 90% *, 95% **, 99% ***. The T-Statistic for the *average* is calculated based on the standard error for the distribution of all transactions occurring on that day.

Day	Senior Officer	Director of Issuer	Large Shareholder	Other insider(s)	**Average**
-5	-0.44 %	-0.05 %	-0.04 %	1.06 %	**-0.32 %**
	-0.60	-0.21	-0.09	0.65	-1.57
-4	0.04 %	-0.12 %	-0.16 %	1.15 %	**-0.01 %**
	0.06	-0.46	-0.33	0.70	-0.05
-3	0.47 %	0.28 %	0.24 %	-1.44 %	**0.37 %**
	0.60	1.08	0.51	-0.88	1.71 *
-2	0.17 %	-0.11 %	-0.36 %	0.47 %	**0.03 %**
	0.22	-0.44	-0.77	0.29	0.16
-1	0.71 %	0.13 %	0.80 %	-0.43 %	**0.66 %**
	0.90	0.47	1.67 *	-0.26	2.93 ***
0	0.20 %	-0.04 %	-0.42 %	2.82 %	**0.04 %**
	0.23	-0.12	-0.83	1.72 *	0.17
1	0.06 %	0.06 %	0.18 %	-1.09 %	**0.07 %**
	0.08	0.21	0.38	-0.67	0.33
2	-0.28 %	0.09 %	0.37 %	-0.65 %	**-0.13 %**
	-0.37	-0.33	0.79	-0.39	-0.60
3	-0.05 %	0.03 %	0.44 %	-0.29 %	**0.04 %**
	-0.06	0.10	0.94	-0.18	0.20
4	-0.20 %	0.02 %	0.20 %	0.10 %	**-0.11 %**
	-0.25	0.07	0.44	0.06	-0.49
5	0.38 %	0.04 %	-0.08 %	0.22 %	**0.25 %**
	0.49	-0.16	-0.16	0.14	1.14
6	-0.56 %	0.13 %	0.02 %	-0.35 %	**-0.40 %**
	-0.74	0.50	0.04	-0.22	-1.86 *
7	0.08 %	0.07 %	0.51 %	0.56 %	**0.15 %**
	0.10	0.26	1.10	0.34	0.71
8	-0.02 %	0.25 %	0.09 %	0.72 %	**0.00 %**
	-0.02	0.95	0.19	0.44	-0.02
9	-0.15 %	0.28 %	0.12 %	-0.13 %	**-0.09 %**
	-0.21	1.06	0.25	-0.08	-0.43
10	-0.35 %	0.12 %	-0.06 %	0.01 %	**-0.26 %**
	-0.46	0.46	-0.12	0.01	-1.22
11	0.60 %	0.29 %	0.41 %	-0.70 %	**0.50 %**
	0.81	1.14	0.84	-0.43	2.29 **
12	0.58 %	0.10 %	0.35 %	0.83 %	**0.47 %**
	0.78	0.39	0.52	0.51	1.94 *
13	0.30 %	-0.01 %	0.29 %	-0.64 %	**0.26 %**
	0.39	-0.02	0.37	-0.39	1.00
14	-0.26 %	-0.14 %	-0.07 %	-0.55 %	**-0.21 %**
	-0.35	-0.53	-0.15	-0.34	-0.96
15	0.03 %	0.16 %	0.32 %	-0.06 %	**0.08 %**
	0.04	0.63	0.67	-0.03	0.37

Table 9: Daily Abnormal Performance of Shares Within -5 and +15 Days of Insider Sales

This table lists the daily abnormal returns for insider sales occurring up to and including the date measured for each category of insider and for the weighted *average*. These measurements have been taken at each day from 5 days prior to the transaction through 15 days subsequent to the transaction. Underneath each date is the associated T-statistic, and its corresponding significance as noted by stars. Significance is noted as: 90% *, 95% **, 99% ***. The T-Statistic for the *average* is calculated based on the standard error for the distribution of all transactions occurring on that day.

Day	Senior Officer		Director of Issuer		Large Shareholder		Other insider(s)		**Average**	
-5	-0.37 %		-0.16 %		-0.43 %		0.01 %		**-0.35 %**	
	-0.55		-0.68		-0.72		0.01		-1.70	*
-4	1.10 %		0.11 %		-0.05 %		-4.27 %		**0.66 %**	
	1.42		0.45		-0.08		-4.29	***	3.03	***
-3	0.11 %		0.22 %		0.01 %		3.26 %		**0.24 %**	
	0.16		0.86		0.02		3.08	***	1.06	
-2	0.53 %		0.26 %		-0.07 %		2.68 %		**0.52 %**	
	0.73		1.02		-0.11		2.59	***	2.36	**
-1	0.47 %		0.25 %		0.05 %		-7.33 %		**0.09 %**	
	0.60		0.97		0.08		-7.00	***	0.38	
0	0.52 %		1.00 %		-0.84 %		-0.77 %		**0.35 %**	
	0.64		3.53	***	-1.01		-0.64		1.39	
1	-0.09 %		-0.23 %		-0.13 %		4.51 %		**0.08 %**	
	-0.12		-0.94		-0.19		4.25	***	0.35	
2	-3.21 %		-0.30 %		-0.10 %		-3.01 %		**-2.57 %**	
	-4.39	***	-1.16		-0.17		-2.86	***	-2.94	***
3	0.04 %		-0.14 %		-0.04 %		-3.61 %		**-0.13 %**	
	0.06		-0.55		-0.06		-3.72	***	-0.60	
4	0.49 %		-0.28 %		-0.45 %		-4.27 %		**0.12 %**	
	0.71		-1.00		-0.65		-4.53	***	0.51	
5	0.24 %		-0.14 %		-0.14 %		0.41 %		**0.16 %**	
	0.35		-0.51		-0.24		0.42		0.70	
6	-0.60 %		0.05 %		-0.12 %		1.18 %		**-0.41 %**	
	-0.88		0.22		-0.21		1.32		-2.01	**
7	-0.34 %		-0.43 %		-0.12 %		-4.39 %		**-0.48 %**	
	-0.50		-1.80	*	-0.19		-4.53	***	-2.32	**
8	0.00 %		-0.39 %		-0.14 %		2.02 %		**0.03 %**	
	0.00		-0.87		-0.14		1.28		0.08	
9	-0.42 %		-0.12 %		-0.25 %		0.81 %		**-0.33 %**	
	-0.61		-0.52		-0.41		0.74		-1.57	
10	-1.12 %		-0.15 %		-1.20 %		0.18 %		**-0.99 %**	
	-1.57		-0.61		-2.03	**	0.17		-4.80	***
11	-1.99 %		-0.41 %		-0.02 %		1.62 %		**-1.47 %**	
	-2.75	***	-1.71	*	-0.03		1.66	*	-7.00	***
12	1.36 %		-0.08 %		-1.08 %		-1.28 %		**0.84 %**	
	1.89	*	-0.32		-1.79	*	-1.26		4.00	***
13	0.08 %		-0.22 %		-0.14 %		1.42 %		**0.08 %**	
	0.12		-0.94		-0.21		1.35		0.39	
14	-0.21 %		0.06 %		0.13 %		1.22 %		**-0.09 %**	
	-0.31		0.24		0.21		1.24		-0.42	
15	0.55 %		-0.12 %		-0.21 %		-1.40 %		**0.33 %**	
	0.75		-0.51		-0.33		-1.43		1.57	

Table 10: Cumulative Abnormal Transaction Volume of Shares Within -5 and +15 Days of Insider Purchases

This table lists the cumulative abnormal transaction volume of shares for insider purchases occurring up to and including the date measured for each category of insider and for the weighted *average*. These measurements have been taken at each day from 5 days prior to the transaction through 15 days subsequent to the transaction. Underneath each date is the associated T-statistic, and its corresponding significance as noted by stars. Significance is noted as: 90% *, 95% **, 99% ***. The T-Statistic for the *average* is calculated based on the standard error for the entire distribution up to and including the given date.

Day	Senior Officer		Director of Issuer		Large Shareholder		Other insider(s)		**Average**	
-5	-0.09 %		-0.11 %		-0.07%		-0.11 %		**-0.08 %**	
	-2.64	***	-1.26		-0.70		-0.94		-1.09	
-4	-0.19 %		0.23 %		-0.21 %		0.04 %		**-0.15 %**	
	-5.20	***	2.53	**	-0.98		0.99		-1.95	
-3	0.29%		-0.13 %		-0.30 %		-0.05 %		**0.13 %**	
	6.58	***	-1.77	*	-2.07	**	-0.12		1.63	
-2	0.06 %		0.07 %		-0.07 %		-0.16 %		**0.02 %**	
	1.06		0.76		-2.11	**	-2.68	***	1.38	
-1	0.28 %		0.46 %		-0.06 %		0.27 %		**0.23 %**	
	4.54	***	2.52	**	-1.73	*	1.53		1.65	*
0	0.68 %		0.54 %		0.04 %		0.40 %		**0.60 %**	
	2.46	**	4.55	***	2.63	***	1.86	*	3.92	
1	-0.18 %		0.58 %		0.85 %		0.97 %		**0.12 %**	
	-2.91	***	3.46	***	4.98	***	2.67	***	1.57	**
2	0.27 %		0.91 %		0.26 %		1.03 %		**0.35 %**	
	3.71	***	4.68	***	1.18		2.98	***	4.66	***
3	0.53 %		1.20 %		0.65 %		1.16 %		**0.63 %**	
	1.97	**	4.70	***	2.88	***	3.78	***	2.99	***
4	0.19 %		0.46 %		1.04 %		0.38 %		**0.38 %**	
	2.37	**	2.37	**	2.78	***	3.46	***	2.55	**
5	0.20 %		0.79 %		1.37 %		0.39 %		**0.47 %**	
	2.29	**	3.31	***	3.66	***	1.63		2.97	*
6	0.37 %		1.16 %		0.92 %		0.56 %		**0.54 %**	
	4.11	***	4.52	***	2.47	***	1.93	*	5.51	**
7	0.11 %		0.45 %		1.40 %		0.68 %		**1.05 %**	
	3.47	***	4.61	***	3.73	***	1.73	*	4.65	***
8	0.72 %		0.88 %		0.88 %		0.87 %		**0.77 %**	
	7.50	***	4.05	***	2.33	*	2.60	***	3.39	***
9	0.62 %		0.87 %		0.70 %		0.64 %		**0.65 %**	
	5.94	***	4.43	***	1.67	***	1.63		5.69	**
10	0.53 %		0.73 %		1.33 %		1.32 %		**0.73 %**	
	4.72	***	3.78	***	3.14	***	3.33	***	3.00	***
11	0.57 %		1.18 %		1.65 %		0.80 %		**0.83 %**	
	5.25	***	4.68	***	3.87	***	1.99	**	3.41	***
12	0.86 %		0.64 %		2.32 %		1.10 %		**1.13 %**	
	7.28	***	4.70	***	5.96	***	2.73	***	4.86	***
13	1.17 %		1.01 %		1.99 %		1.39 %		**1.32 %**	
	5.70	***	5.96	***	5.75	***	3.43		5.86	***
14	1.40 %		1.39 %		2.75 %		0.60 %		**1.61 %**	
	4.98	***	6.39	***	5.87	***	1.60		4.52	***
15	1.59 %		1.68 %		3.08 %		0.76 %		**1.84 %**	
	3.91	***	5.20	***	6.17	***	1.24		4.25	***

Table 11: Cumulative Abnormal Transaction Volume of Shares Within -5 and +15 Days of Insider Sales

This table lists the cumulative abnormal transaction volume of shares for insider sales occurring up to and including the date measured for each category of insider and for the weighted *average*. These measurements have been taken at each day from 5 days prior to the transaction through 15 days subsequent to the transaction. Underneath each date is the associated T-statistic, and its corresponding significance as noted by stars. Significance is noted as: 90% *, 95% **, 99% ***. The T-Statistic for the *average* is calculated based on the standard error for the entire distribution up to and including the given date.

Day	Senior Officer		Director of Issuer		Large Shareholder		Other insider(s)		**Average**	
-5	-0.13 %		-0.05 %		-0.05 %		0.04 %		**-0.10 %**	
	-0.52		-0.62		-1.98	**	1.15		-0.58	
-4	0.24 %		-0.08 %		-0.16 %		-0.04 %		**0.15 %**	
	1.00		-0.96		-0.88		-0.96		0.82	
-3	0.23 %		0.47 %		-0.27 %		0.15 %		**0.19 %**	
	0.48		2.13	**	-1.36		0.46		1.17	
-2	0.09 %		0.05 %		0.43 %		-0.41 %		**0.10 %**	
	1.76	*	0.58		1.92	*	-1.29		0.42	
-1	0.36 %		0.21 %		0.54 %		0.73 %		**0.38 %**	
	1.84	*	2.45	**	2.66	***	2.01	**	1.65	*
0	0.41 %		0.34 %		0.49 %		0.71 %		**0.43 %**	
	1.68	*	3.34	***	2.43	**	1.96	*	1.63	
1	0.36 %		0.64 %		0.39 %		1.14 %		**0.42 %**	
	1.46		3.16	***	2.06	**	3.10	***	2.26	**
2	0.48 %		1.01 %		0.20 %		1.47 %		**0.54 %**	
	1.91	*	5.51	***	2.88	***	4.82	***	2.87	***
3	0.44 %		1.24 %		0.44 %		0.74 %		**0.53 %**	
	2.00	**	4.46	***	1.88	*	2.25	**	2.80	***
4	0.14 %		0.56 %		1.66 %		0.64 %		**0.37 %**	
	1.64		1.99	**	2.33	**	1.94	*	1.98	**
5	0.34 %		0.74 %		1.84 %		0.31 %		**0.54 %**	
	3.79	***	2.56	**	2.74	***	2.95	***	1.74	*
6	0.58 %		1.05 %		1.15 %		0.48 %		**0.68 %**	
	0.87		3.77	***	1.97	**	1.56		2.17	**
7	0.89 %		1.38 %		1.42 %		0.87 %		**1.00 %**	
	1.10		4.98	***	2.25	**	2.58	***	3.17	***
8	0.82 %		0.84 %		1.71 %		0.96 %		**0.93 %**	
	7.98	***	3.01	***	2.70	***	2.55	**	2.97	***
9	0.70 %		0.84 %		1.08 %		0.33 %		**0.74 %**	
	6.44	***	3.01	***	1.71	*	2.74	***	2.39	**
10	0.62 %		0.57 %		1.34 %		0.56 %		**0.70 %**	
	5.46	***	2.04	**	2.11	**	4.60	***	2.89	***
11	0.54 %		0.92 %		1.74 %		0.79 %		**0.73 %**	
	4.65	***	3.30	***	4.39	***	6.32	***	3.01	***
12	0.95 %		1.30 %		2.12 %		0.93 %		**1.11 %**	
	7.53	***	4.66	***	3.13	***	1.70	*	4.88	***
13	1.35 %		0.76 %		2.39 %		1.16 %		**1.41 %**	
	1.66	*	2.73	***	3.74	***	2.91	***	3.16	***
14	0.87 %		1.14 %		2.62 %		0.62 %		**1.09 %**	
	6.53	***	4.10	***	4.41	***	1.54		4.75	***
15	1.23 %		1.51 %		2.82 %		0.84 %		**1.42 %**	
	1.70	*	4.70	***	4.40	***	2.07	**	3.85	***

Table 12: Daily Abnormal Transaction Volume of Shares Within -5 and +15 Days of Insider Purchases

This table lists the daily abnormal transaction volume of shares for insider purchases occurring up to and including the date measured for each category of insider and for the weighted *average*. These measurements have been taken at each day from 5 days prior to the transaction through 15 days subsequent to the transaction. Underneath each date is the associated T-statistic, and its corresponding significance as noted by stars. Significance is noted as: 90% *, 95% **, 99% ***. The T-Statistic for the *average* is calculated based on the standard error for the distribution of all transactions occurring on that day.

Day	Senior Officer		Director of Issuer		Large Shareholder		Other insider(s)		**Average**	
-5	-0.08 %		-0.11 %		-0.07 %		-0.11 %		**-0.08 %**	
	-0.65		-1.53		-0.70		-1.59		-1.14	
-4	-0.11 %		0.35 %		-0.13 %		0.16 %		**-0.06 %**	
	-0.84		3.05	***	-1.02		0.60		-0.95	
-3	0.48 %		-0.37 %		-0.9 %		-0.05 %		**0.28 %**	
	1.86	*	-2.76	***	-3.06	***	-1.07		2.21	**
-2	-0.23 %		0.20 %		0.22 %		-0.16 %		**-0.10 %**	
	-1.10		2.21	**	1.53		-2.59	***	-2.31	**
-1	0.22 %		0.38 %		0.01 %		0.44 %		**0.20 %**	
	0.81		1.64		0.05		1.81	*	2.67	***
0	0.40 %		0.08 %		0.46 %		0.13 %		**0.37 %**	
	1.75	*	1.25		2.89	***	1.70	*	2.16	**
1	-0.87 %		0.03 %		0.46 %		0.57 %		**-0.48 %**	
	-3.11	***	1.56		2.55	**	2.05	**	-3.04	***
2	0.45 %		0.33 %		-0.59 %		0.05 %		**0.23 %**	
	1.94	*	2.63	***	-3.41	***	0.61		2.36	**
3	0.25 %		0.29 %		0.38 %		0.13 %		**0.28 %**	
	3.41	***	1.79	*	2.71	***	1.30		2.85	***
4	-0.33 %		-0.74 %		0.39 %		-0.77 %		**-0.25 %**	
	-1.54		-1.73	*	2.71	***	-2.49	**	-1.79	*
5	0.01 %		0.32 %		0.33 %		0.01 %		**0.09 %**	
	0.11		3.53	***	4.06	***	0.03		0.85	
6	0.17 %		0.37 %		-0.44 %		0.17 %		**0.07 %**	
	1.88	*	3.24	***	-1.94	*	1.41		2.39	**
7	0.67 %		-0.71 %		0.47 %		0.11 %		**0.50 %**	
	2.35	**	-4.07	***	2.29	**	0.98		3.21	***
8	-0.33 %		0.43 %		-0.52 %		0.19 %		**-0.28 %**	
	-1.14		1.60		-2.01	**	1.57		-1.96	**
9	-0.09 %		-0.01 %		-0.17 %		-0.23 %		**-0.11 %**	
	-0.94		-0.40		-1.82	*	-1.88	*	-1.25	
10	-0.08 %		-0.13 %		0.63 %		0.67 %		**0.07 %**	
	-0.79		-2.03	**	2.46	**	1.72	*	2.13	**
11	0.03 %		0.44 %		0.31 %		-0.52 %		**0.09 %**	
	0.36		4.62	***	2.83	***	-3.62	***	2.52	**
12	0.29 %		-0.53 %		0.66 %		0.29 %		**0.29 %**	
	2.47	**	-4.55	***	3.00	***	2.04	**	2.48	**
13	0.31 %		0.37 %		-0.32 %		0.28 %		**0.19 %**	
	2.57	**	4.92	***	-2.40	**	1.89	*	4.45	***
14	0.22 %		0.38 %		0.75 %		-0.79 %		**0.29 %**	
	1.76	*	4.11	***	5.09	***	-5.07	***	6.20	***
15	0.19 %		0.28 %		0.32 %		0.16 %		**0.22 %**	
	1.51		3.09	***	2.07	**	1.08		4.58	***

Table 13: Daily Abnormal Transaction Volume of Shares Within -5 and +15 Days of Insider Sales

This table lists the daily abnormal transaction volume of shares for insider sales occurring up to and including the date measured for each category of insider and for the weighted *average*. These measurements have been taken at each day from 5 days prior to the transaction through 15 days subsequent to the transaction. Underneath each date is the associated T-statistic, and its corresponding significance as noted by stars. Significance is noted as: 90% *, 95% **, 99% ***. The T-Statistic for the *average* is calculated based on the standard error for the distribution of all transactions occurring on that day.

Day	Senior Officer		Director of Issuer		Large Shareholder		Other insider(s)		**Average**	
-5	-0.13 %		-0.05 %		-0.05 %		0.04 %		**-0.10 %**	
	-2.12	**	-2.16	**	-2.29	**	0.99		-1.73	*
-4	0.37 %		-0.02 %		-0.11 %		-0.08 %		**0.26 %**	
	1.46		-2.19	**	-0.52		-1.76	*	1.93	*
-3	-0.00 %		0.55 %		-0.11 %		0.20 %		**0.04 %**	
	-0.08		2.71	***	-0.49		0.67		0.59	
-2	-0.14 %		-0.42 %		0.71 %		-0.57 %		**-0.09 %**	
	-2.90	***	-1.74	*	3.31	***	-1.67		-1.19	
-1	0.27 %		0.16 %		0.10 %		1.15 %		**0.28 %**	
	5.31	***	1.88	*	2.58	***	3.15	***	3.65	***
0	0.05 %		0.12 %		-0.04 %		-0.01 %		**0.04 %**	
	1.04		1.86	*	-1.30		-0.31		3.34	***
1	-0.05 %		0.30 %		-0.09 %		0.42 %		**-0.00 %**	
	-0.98		3.41	***	-2.63	**	5.26	***	-2.19	**
2	0.12 %		0.36 %		-0.19 %		0.32 %		**0.11 %**	
	1.63		4.01	***	-4.79	***	3.42	***	2.09	**
3	-0.03 %		0.22 %		0.24 %		-0.73 %		**-0.01 %**	
	-0.48		2.48	**	1.29		-1.96	*	-0.52	
4	-0.30 %		-0.68 %		1.21 %		-0.09 %		**-0.15 %**	
	-3.94	***	-4.28	***	5.34	***	-1.23		-2.82	***
5	0.20 %		0.18 %		0.18 %		-0.32 %		**0.17 %**	
	2.96	***	2.44	**	2.99	***	-4.08	***	3.18	***
6	0.24 %		0.30 %		-0.69 %		0.17 %		**0.13 %**	
	4.18	***	2.95	***	-3.67	***	2.05	**	3.38	***
7	0.31 %		0.33 %		0.27 %		0.38 %		**0.31 %**	
	5.56	***	3.75	***	2.29	**	4.89	***	4.89	***
8	-0.07 %		-0.54 %		0.28 %		0.09 %		**-0.06 %**	
	-0.94		-4.20	***	1.88	*	1.03		-2.83	**
9	-0.12 %		0.00 %		-0.62 %		-0.62 %		**-0.19 %**	
	-1.71	*	0.01		-3.96	***	-5.25	***	-3.41	***
10	-0.07 %		-0.27 %		0.25 %		0.22 %		**-0.04 %**	
	-1.03		-2.98	***	1.65		2.56	***	-2.07	**
11	-0.07 %		0.35 %		0.40 %		0.23 %		**0.03 %**	
	-1.12		3.87	***	2.59	***	1.95	*	1.35	
12	0.40 %		0.38 %		0.38 %		0.13 %		**0.38 %**	
	1.80	*	4.18	***	2.43	***	1.04		4.88	***
13	0.40 %		-0.54 %		0.26 %		0.22 %		**0.29 %**	
	1.52		-4.17	***	1.52		2.57	***	3.95	***
14	-0.47 %		0.38 %		0.23 %		-0.53 %		**-0.32 %**	
	-2.54	**	4.46	***	1.13		-1.52		-4.31	***
15	0.35 %		0.36 %		0.19 %		0.21 %		**0.33 %**	
	2.58	**	4.07	***	1.66		2.09	**	2.97	***

The results of this study strongly support the evidence found in older insider trading papers Rogoff (1964), Glass (1966), Lorie & Neiderhoffer (1968), Scholes (1972) Jaffe (1974), that in companies for which information is relatively poorly available, or then difficult to acquire, the trades completed by insiders are interpreted by the market as signals of future potential performance.

Furthermore, from Tables 10 and 11 we can also see that the trades by large shareholders caused the largest volume of shares to be traded during the period 0 to +10, while at the same time trading approximately 0.45% and 0.30% of their company's shares for the buys and sells respectively in Table 5. In all categories of insiders, we can see that they are on average net buyers of shares, and the largest accumulators of shares.

Because of the apparent attribution of future price prediction caused by insider trading, Lorie & Neiderhoffer's (1968) statement that "proper and prompt analysis of data on insider trading can be profitable" holds true for these companies. It also gives strong credence in most of the insider categories to their view that by the time the insider trade information was publicly available, very little further profits are to be made from acting on the published data, as 68.92% of the CAR had accumulated by day +10 for insider buys, and 90.77%[22] for sales by insiders.

The difference in the levels CAR from table attributed to each category of insider also concurs with the conclusions of Seyhun (1985) that higher level insiders trade on more valuable information and cause greater levels of CAR. Though, the value assigned to different types of information is different for each type of major market participant. The typical interpretation of Seyhun's (1985) conclusions is true mainly for average investors who attribute value to corporate decision makers, as senior officers and directors receive their largest changes in CAR and CAV after the public disclosure of the trade information. The street gossip participants on the other hand, appear to attribute more importance to insiders that possess a greater financial stake in the company, as the CAR and CAV occurring between 0 and +10 is greatest for large shareholders and other insiders.

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[22] Calculated as weighted averages of CAR on day 15 vs. day 10 for purchases and sales separately. See tables 7 and 8.

This could be either because the professional investors that comprise the "street gossip" participants consider financial influence as more high level information than average investors who perceive intimate knowledge of the daily corporate activities as more important information. These points will be discussed further in later subsections of the discussion section.

This also agrees with the findings of Basel & Stein (1979) who found that financial backers of the firms (i.e. bankers. which approximate the large shareholder category in the context of this study) received the highest cumulative abnormal returns. In fact, the ratio between the amount of CAR earned by their study and this paper's results are a close match. Basel & Stein found that the ratio of CAR for bankers to ordinary insiders (i.e. officers and directors of the firms) for insider purchases was 2.05[23] while for sales their results indicated a ratio of 1.5[24]. My results indicate a ratio for insider purchases of 2.32, and for insider sales 1.98[25] showing that the market appears to attribute a similar amount of additional value to large financial shareholders in the Canadian market in both cases.

In agreement with the findings of Jaffe (1974) the results show that insiders were equally as likely to sell shares as they are to purchase them with total buy and sell levels differing by only 1.9%. As insiders are often compensated using shares, it seems reasonable that we observed a high degree of selling and of purchasing for employees of the firms, as most of these trades would have been the exercise of options counted as buys, and their disposal in the marketplace counted as sells. Though, in reality, we observed a net accumulation of shares[26], which also concurs with Jaffe's findings that insiders are on average net accumulators of shares in their companies. This implies that insiders are also purchasing more shares than they are selling and thereby must be using their personal wealth to invest further into the

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[23] 7.8%/3.8% at the end of 12 months.
[24] -6.3%/-4.3% at the end of 12 months.
[25] These ratios were calculated based on using the final CAR values obtained on day+15. I use Large shareholders as the equivalent for their bankers category, and a weighted average value of senior officers and directors to represent the ordinary insider category. The results are based on the ratios for purchases of 3.15%/1.355% and -5.33%/-2.68% for sales.
[26] Accumulation by insider category on average for the entire period studied:
Senior officer: 12.66%,
Director of Issuer: 0.61%
Large Shareholder: 8.26%
Other Insider(s): 0.05%

business. Hence, on average, insiders appear to show confidence in the ability of their firms to return a profit, and thence have a positive outlook on the future.

The even level of buying to selling (by number of transactions) may stem from the way in which transactions were classified in this study, and may in fact under estimate the amount of shares owned by insiders (those who are employees of the firm with particular emphasis on managers). Theoretically, if insiders are buying at a rate only slightly higher than they are selling, then their expected holdings at any given time should be equal to the difference between their average purchasing and selling amounts. However, since I did not include the outright grant of shares of as a transaction to be measured, the real net ownership and accumulation ratios may not be accurately reflected by this study's results. As the insider initiated buy/sell ratio is already positive, by adding to that sum the shares that are granted without charge to insiders as compensation we can see that these insiders are in fact, potentially accumulating many more shares than measured. This effect would be most notable for senior officers and directors whom already have accumulation percentages of 12.7% and 0.65% meaning that senior officers indeed accumulate shares to a very high degree.

5.1 Low Share Price and Liquidity Effect

From Figures 6 and 7 we can see that the slopes of the CAR curves are volatile, though relatively consistently increasing during the time before public release. This could be due to the trickle effect, as the more people that know about the information; the more it spreads into the market and causes a gradual rise in activity. Alternatively (or concurrently) it could also be a result of knowledgeable market players attempting to cause only gradual changes in the market to avoid raising suspicions, or setting off any alarms (in particular those set by market observers at the OSA). However, it is important to note that the average trend shown here does not reflect the fact that for most firms the curves are not quite so smooth. In most cases (particularly those where the company's shares are worth less than 50 cents each) the curve is much more volatile with spikes up and down, though still maintaining a trend upwards/downwards in a buy/sell situation as seen in Figures 6 and 7. Hence, observation of any individual transaction does not give an accurate reflection of the aggregate curves and changes. Unfortunately this is also a factor when comparing these results to those of previous studies, as the prior literature does not contain a graphical representation of the development

of their abnormal returns, nor do they present them in sufficiently frequent intervals to be able to make any meaningful comparisons. They only present final results, or at best, such as in the case of Jaffe (1974) they present the information from three intervals within the study.

An unavoidable inherent weakness of this study stems from the nature of the shares examined. Since JNRs are generally worth very little for the majority of their existence, they also have share prices that normally range between 10 to 50 cents. The problem with this is that any change in share prices that may occur through trading of the security (be it to adjust for an insider's signal effect or for any other reason) will cause a significant change in percentage terms in the price of the security. Unfortunately, this change may not accurately reflect the intended percentage change desired by the market, but due to the indivisibility of the smallest unit of change available[27], it is the minimum by which the price can change. This phenomenon was observed in many of the low share price companies, in the form of extremely volatile results. The day to day change in CAR for some of these firms was noted to have been in excess of 20% and even 30% in some cases. This was seen in some transactions as fluctuations between negative and positive CAR results, or sudden spikes along a trend either increasing or decreasing depending on the transaction type (either buy or sell respectively). Compounding this problem is that the majority of JNR firms in general are priced at these low levels. However, in the other firms that were priced above that level, much less anomalous CAR volatility was noted, and the shape of their respective curves approached the appearance of the average curves for each category of insider as presented in the results section.

It is due to these low prices that an average investor would be hard pressed to observe an insider's trade between days 0 and 10 in low priced stocks since the stock's day to day volatility may serve to cloak the trade without a clear trend until several days past the transaction date.

Taking the above into account, although this may seem like an extremely profitable idea to mimic the trades of insiders by observing the trend and trading the stock soon between 0 and 10, it is probably not feasible for the average investor to do, unless they have access to some level of confirmation of the existence of insider trading, or of the root cause of the trade from

a reliable source. For the average investor, obtaining access to such information is extremely difficult at best. Although modern technologies such as the internet have created discussion forums for investors to exchange views on particular stocks, and potentially ease (and accelerate) the spread of such information, the reality of the situation is that these forums contain typically little more than amateurish speculation and a minimum of useful information. They are not a place in which members of the "street gossip" participants would go to spread their information.

Amplifying the low share price effect on CAR is another important factor in CAR calculations that is a typical characteristic in JNRs. That is, a low level of liquidity. Since these companies are often anywhere from micro cap in size (less than 10 million dollars quoted value) to small cap (100 million dollars quoted value), the investor base (by number of active traders) for any one company is bound to be small. Confirming that theory, many of these companies were also seen to have multiple consecutive days without any transactions, though this is not visible in the abnormal volume tables which only gives averages of the categories.

This can also affect the CAR results, as when days may go by without any volume, no changes in the price of the share to reflect changing views of the market. Oftentimes this can be due to as simple a fact as either a bid-ask spread that is too far apart to result in transactions, or then a lack of market participants willing to trade the security at all to be able to shift the pre-insider trade price towards its correct insider trade information incorporated price level, which would also logically agree with the concept presented by Glosten & Milgrom (1985) that the markets may be maintaining a larger bid-ask spread to counteract the effects of insiders trading in these firms in an attempt to prevent the insiders from being able to transact and earn significant abnormal profits.

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[27] On the TSX Venture Exchange the smallest unit is 0.5 cents, though after a stock's price is over 25 cents the most popular unit becomes 1 cent even though the 0.5 cent unit is still available.

5.2 Market Expectations

What is interesting to note is that on average, the CAR is experiencing greater losses for sells than gains for buys. This agrees with the findings of Basel & Stein (1979), and Jabbour & Jalivand (2000), and is occurring in very similar ratios to those studies as well, as shown in Table 14 below. It appears that investors are more severely reacting to bad news implied by trades than to good news.

Table 14: Buy to Sell ratio of CAR for Comparable Studies

When comparing the size of CAR caused by buys versus sells, the ratios obtained by this study clearly resemble those of other similar studies.

Study	Buy to Sell ratio of CAR
Jabbour & Jalivand	– 0.67
Basel & Stein	– 0.60
This study	– 0.52

In the context of this study, it seems to suggest that investors fear loosing their invested capital more than they wish to react to a potential "bonanza" or "lottery ticket" company. This could be seen as showing some conservatism in investors who wish to follow a more cautious wait and see style of investing and may wait for a couple more positive press releases to confirm that the company is a worthy investment target. On the other hand, when they see bad news they are more willing to believe it and push the price of a company down to ensure their capital is not lost. In short, it is easier to understand the implications of negative news than it is to overcome the wall of worry as to whether the discovery is economic or not.

This most likely stems from scepticism in the industry and investor base, as it is much more probable that a company rumoured to be doing poorly is actually doing poorly than a company rumoured to have found a large deposit of mineralization to be true[28]. Since historically, it has been the case that the majority of these companies have been unsuccessful, while the major finds have been rare. The market expects that the company's probability of success will follow the average probability of the market, and thence, they react in the changes to the share's prices based on those expectations.

[28] Some of this scepticism is a remnant of the Bre-X Minerals Ltd. scandal that shook the marketplace in the mid 1990's and resulted in what was believed to be the world's largest gold deposit that was revealed to have been created using fraudulent drill results. It resulted in a major revision of the reporting standards used, and the creation of National Instrument 43-101 which aims to ensure that drill results are reported accurately. See Fortune Magazine article.

Some of the categories of insiders for which this study has tested have shown CAR results that were not in line with the expectations of the thesis. However, they may be in line with the market's expectations. The market may expect that insiders are net buyers, and thus react less severely to insider purchases, as was seen in the fact that the absolute abnormal returns were much higher for sales than purchases. Those who are tied most closely to the company appear to be expected to believe in the company the most, and to have the highest accumulation ratios. Market expectations were proven in practice with one company, when in December of 2003 Goldcorp Inc. whose CEO sold over half of his holdings of his company's shares[29]. This created shock in the market, and a dip in the company's share price, as nobody had expected him to sell, particularly such a large amount[30]. This would also help to explain the relatively low senior officer CAR results, as it could be that the market expects that senior officers buy shares in the company, and that they "believe in it" regardless of the actual status of the company's future prospects.

This is true for directors as well, but to a lesser degree, as they are somewhat distanced from the company, and as such, may not be as highly expected to continue to hold or accumulate shares in their firm.

Outside investors (i.e. large shareholders) on the other hand, most likely do not have any particular market expectations attached to them, which would imply that their CAR reactions could be said to be the least biased of all, as they are reflective of the opinions of market professionals that have carefully completed due diligence, and are most likely to follow a company with good growth potential, rather than focus on any one company due to other obligations or attachments.

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[29] See Forbes article, and SEDI.

[30] The official statement of the CEO was that he was simply diversifying his portfolio, and was surprised by the market's reaction.

5.3 Low Correlation

A major reason that correlation is low and CAR is large is that from looking at the data, it would appear that insiders transact in clusters. This is true across multiple categories (i.e. large shareholders and senior officers both trade on the same day) closely spaced, either on the same day, or on consecutive days or then separated by just a few days.

Table 15 : Number of Simultaneous Transactions per Day Within a Single Firm

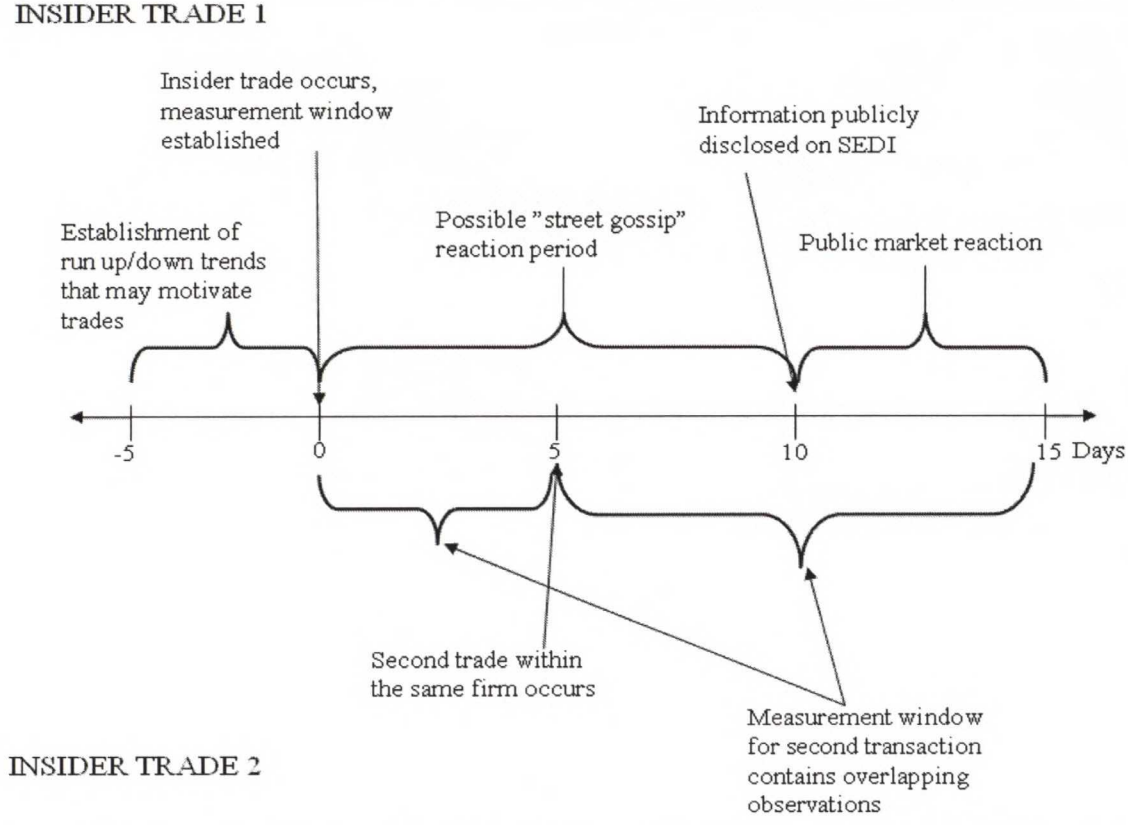
This table contains the count of the number of simultaneous transactions occurring within a given firm on a single trading day. The high level of simultaneous trade days (particularly the large cluster of up to 5 trades within a company per day may indicate that there is most likely some degree of insiders who are trading based on the same information. Alternatively, it may also simply be a reflection of the need to break down larger trades by insiders into portions that can be better absorbed or fulfilled by a relatively thin market. Though the precise source of this simultaneity is debatable; this degree of concurrence is very highly unlikely to be completely due to random coincidence.

	1	2	3	4	5	6	7	8	9	10
Purchases	4445	4872	2571	1342	1055	496	146	299	22	16
Sales	7478	4079	1715	1102	472	490	182	47	1	0

Therefore, it is likely that the CAR and CAV values for each of those transactions are amplified because of their concurrence, and as such don't necessarily reflect the amount of shares traded in one particular trade, since the CAR is representative of all the trades combined over the period tested. This is also supported by the insignificance of these statistics (which were confident at only 54% and 73%). The theory behind this point is illustrated in Figure 8, where the compounding effect of insider trades and their associated calculations may cause the correlation coefficient to be erroneous.

Figure 8: Event Window Overlap Problem

As an illustration of the issue faced with regards to insider trade clustering, we can see exactly why it can be so difficult to attribute any particular share price movements to one trade in particular. Here we can see that when trade 2 occurs and triggers the measurement of the abnormal returns it can be measuring price changes which are not purely related to it. This can cause particular difficulty in CAR and CAV attribution if the trades are extremely different in nature (i.e. different insider category, buy vs. sell, sizes of trades very different).



This was observed more frequently in purchases in companies that were successful in the period following the transaction cluster. The fact that clustering occurs more with buys than sells appears to indicate that it is management acting on similar information at the same time (i.e. prior knowledge of upcoming good news) versus sales which may be more often motivated by personal reasons. Indeed, this strongly reinforces the idea that management is withholding information in accordance with the findings of Trueman (1983) in order to personally benefit from it financially before its public disclosure.

Alternatively, the correlation coefficient could be low because of insiders trading multiple small lots rather than one large one. Though the complex algorithms may not be used as was described in the *literature review* chapter, it is still possible that insiders have split their trade lots into smaller fractions in an effort to compensate for the firm's smaller liquidity or thinner market depth. This would also account for the large simultaneity of trades noted in Table 15.

Another part of the reason that the correlation coefficient is insignificant for at least certain cases could be explained by the ownership structure behind the company. When there are relatively few owners (i.e. a high proportion of insider ownership) then the CAR and CAV reactions in these stocks should be less than in the more widely held securities. This is because the large owners (as insiders) would already be aware of the information on which one of the other insiders is trading, and the price should have already incorporated it.

5.4 Average Investor Last to Know

The most interesting result of the CAR and CAV calculations is that in every category of insider, there are definite and statistically significant CAR and CAV results increasing relatively consistently up to the date of the release of the information on SEDI 10 days later. After those 10 days, we can see another slight change in CAR and CAV. Clearly, this presents strong evidence for the theory that "street gossip" does occur, and that the information of an insider's trade spreads quickly to other market players. However, the recipients of this information appear not to be the average outside retail investor, as there is the small spike in CAR occurring after the public disclosure of the trade information on SEDI. The size of this spike is partly due to the fact that retail investors tend to hold very small fractions of the company's total outstanding shares, and do not have the same degree of price influence as larger share block holders. The recipients of "street gossip" are most likely large holders of company stock who can act as market makers or manipulators. The other reason that the increase in CAR after publication is small is that by that time most, if not all of the information conveyed by the trade is incorporated into the stock price, and there is little adjustment room left for the average investor to make.

These "street gossip" participants must be professional investors who are either tied to the company through personal relationships (i.e. family members of insiders), large shareholders below the reporting limit (i.e. investors with significant ownership, though still less than 10%) or investment houses. Unfortunately for the average retail investor, this means that they are typically the last to know about changes in the company's outlook, and therefore the ones from who more informed professionals tend to profit. Sadly this seems to indicate that at least for the JNR industry, from the perspective of insider trading's effects, they are a

category of stocks that are most profitable for well connected large market participants at the expense of average investors.

The existence of CAR and CAV prior to day +10 presents strong evidence that Meulbroek's (1992) findings that the market detects insider trading and incorporates it into the stock price. However, Meulbroek does not specify how this detection and integration occur, and I suggest that at least in the case of JNRs the only way would be for market participants to hear rumours (street gossip) through which they would be able to look for anomalous or unusual activity in the day's trades. One possible reason for the better informed nature of larger shareholders is their ability and willingness to devote more of their time to due diligence, and more frequent reviewing of the company's status. Their investors pay them as managers to do just to enable acceptable rates of return. Average retail investors on the other hand, may not be able to devote as much time to such matters, and often buy shares based on the information contained only in press releases which they may or may not fully appreciate. They on average don't attend company conferences or presentations where they would meet the major market participants and be able to potentially join the group of traders involved in "street gossip".

5.5 Other Insider

The highest values of CAR were noted in sales to have occurred in the category "Other Insiders". Selling in this category caused particularly large CAR and CAV, which initially seems unexpected, considering that these insiders traded the fewest times and with the least amount of shares, but can be explained.

This insider group contains individuals and organizations that are at the core of the company, including a category for the company itself. Investors have assigned this category a particularly high signal value in negative cases due to the fact that category contains the issuer itself, and its subsidiaries. In the other categories of insiders who are employees, the insiders are all individuals, who could be seen to have different personal priorities for their funds (i.e. better growth opportunities elsewhere) or then interpret the information they receive differently than other insiders. These "human discrepancies" seem to have been taken into account in the CAR being lower for sales for those categories. In the case of the issuer itself, any moves made are as a result of a unanimous consensus amongst the leaders of the

company, and their movements are therefore much more significant. In other words, if the company itself sells its own shares, people see that as an extremely serious indication of poor future prospects. Hence, if they are not interested in investing in themselves, then investors interpret that as there being a great likelihood that this stock would not be an appropriate investment for other outside investors either. This view must be particularly strong, as these sale transactions are for only 0.10 % of the company, which is the smallest figure of all of the insider categories.

This agrees with Scholes (1972) who concluded that the sales by the corporation and corporate officers (his equivalent category to my "other insiders") contain information of significant value. They sell when the security is considered to be overvalued in the market, and see an opportunity to take profits. Though this could logically imply that highly positive CAR should occur for the other insider category as a show of solidarity by the company in purchasing its own shares. It should indicate a high degree of confidence in its future. From the results, we can see that this is the case, though absolute values of CAR for other insider purchases are not as high as the absolute CAR caused by sales. Clearly investors regard these purchases as important due to their reflection of a consensus of management and the board of directors as to the company's future.

Another factor likely to be augmenting the CAR levels observed in this insider category is the timing of these trades. They are usually completed in times when the company is in its relative infancy or when the company is in a dormant stage, and its share price and transaction volume is the lowest, which is confirmed by this category receiving the lowest CAV of all categories for both buys and sells[31]. Any changes in the share price or spikes in trade volume in these periods raise the attention levels of the other market participants and causes an increase in activity, and a fluctuation in the share price. This is precisely why the other insider CAR curves are notably more volatile than other categories, as the share prices are low, and its changes cause a relatively large percentage change vs. the market index.

Meulbroek's (1992) conclusion regarding the detectability of insider trading by the market is also most applicable in this case as an explanation of CAR results occurring immediately after day 0. As the company trades in its own shares, its trading house would be known to the

[31] See tables 11 and 12

market (unless the anonymous trading name is used), and large block trades in the company's stock by that trading house would be inferred to be highly likely initiated by "other insider" traders. It could be argued that market detectability is difficult due to the availability of the Anonymous trade name, but since the true identities are released at the end of the day, market participants could still react to the information beginning on day +1.

5.6 Large Shareholder

Large shareholders are defined as individuals who own in excess of 10% of a company's outstanding shares, but are not involved in its management. Most often these are banks, investment houses, and even wealthy private individuals that act as financiers that provide capital for the JNRs in order to continue to drill and explore their properties. In this study they received the most variable results, which some might interpret as odd, given that they are usually amongst the largest single holders of a stock. Again, this might be better understood when considering the unique aspects of JNRs. In many cases, (particularly those in which a company runs through cycles of unsuccessful properties) financiers continue to finance and refinance the company over several years. (This is reflected in this category having the highest average purchase amount).

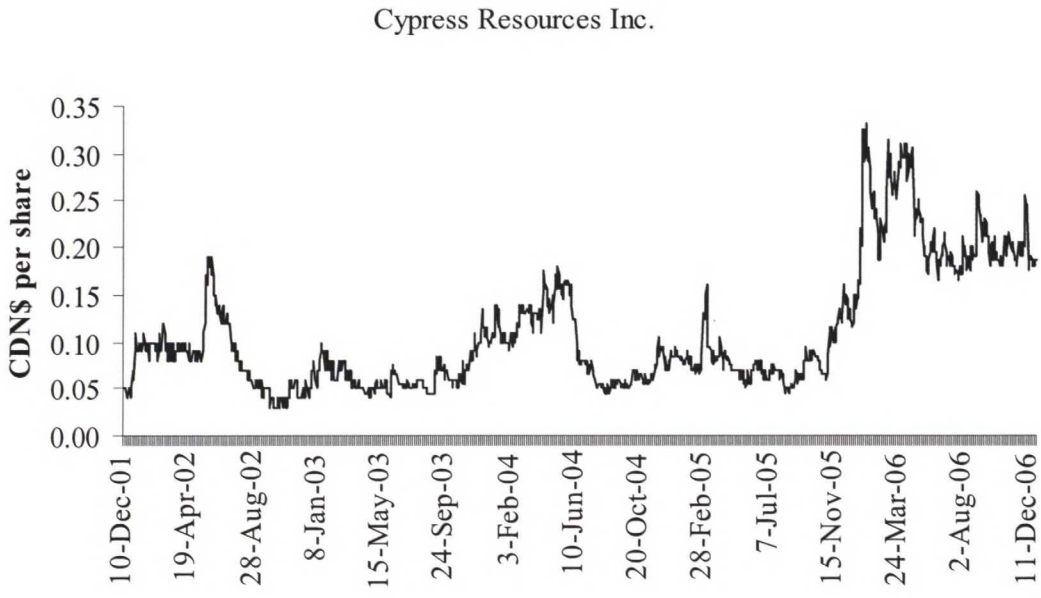
The CAR of the observations was highly variable from company to company for large shareholders; with CAR for certain companies averaging close to zero, while in others it followed an extremely steep trend line. Upon further investigation, it appears that investors in different firms attribute different levels of information to trades by large shareholders based on the financing and trading strategy used to fund the company's exploration endeavours.

For those companies in which a single large financier was used repetitively, the CAR was closest to zero. It appears that oftentimes these large shareholders have different investment priorities and criteria of a successful investment according to which they invest. They tend to prefer to invest purely for small but short term returns which may partly stem from flow-through share investors. This results often in sales by a large shareholder even though they may have only gained a small fraction in their prices (about 10-15% returns). This is done because the investor is either impatient, reformulating their portfolio, or is performing what is known as a "pump and dump" strategy of financing. A pump and dump arises when an investment is made into the company by a large shareholder at a low point in the price cycle

of the shares. They then begin to promote the company by completing road shows, or advertising to other investors at industry conventions[32], etc. The influx of cash is usually enough to support continued drilling of the property, and on the excitement of new investors, they begin to exit. In these companies this can be relatively easy to do, as the large shareholder becomes a market maker by providing significant liquidity at a price of its choice. When a share price is only at 20 cents, a rise of 2-3 cents creates the 10-15% return desired by the financier. This practice is technically illegal, but its legality in practice can be blurred by positive reaction investors have to the news of an influx of cash. This is especially true (and particularly grey waters legally speaking) in companies that are relatively unsuccessful in their attempts to discover a deposit, or have just come out of a period of dormancy.

Figure 9: Cypress Resources Inc and the "Pump and Dump" Financing Strategy

One company that has been accused of using the pump and dump strategy of some JNRs, is Cypress Resources Inc. (CYP). Over the course of its recent past, it has had several financings, though its drill results had failed to reveal any meaningful mineralization on its properties. The peaks in the share prices perfectly coincide with each of these financings, raising accusation and suspicions among investors. At each of these times the company increased its promotion campaign and advertised the successes of its neighbouring JNR ventures' properties as a means of inferring similar possibilities for success on their land.



[32] The largest such convention is the PDAC (Prospector's and Developer's Association of Canada) conference held in Toronto each March. Major and minor industry players gather in an effort to spread knowledge of their findings, and to raise awareness of their company.

The other main type of large shareholder is when they purchase mainly through private placements and trade less frequently, holding for longer intervals. These investors appear to be much more actively interested in their investment's longer term prospects and accept greater risk for larger returns. These private placements, and indeed, many other large shareholder purchases occur after the large shareholder has visited the actual mineral property. It is common practice for JNRs to invite these investors to send an analyst representative to the actual site[33] so that they can evaluate for themselves the potential of the property and aid them in making a decision to invest in the company[34]. Often these trips can include not only visual inspection of the land, but also a viewing of drill core, of which a portion may not yet have been analyzed and their results released publicly. Trading on this information is not technically illegal, as it is difficult to assign any quantitative value to unprocessed core, but visible mineralization in these samples is occasionally present, and does represent strong evidence of potentially positive drill results to come.

The investors of these companies appear to be aware of this, and it is reflected in not only the days preceding public dissemination, but also in the days following it. Both "street gossip" participants and average investors attribute significance to these transactions. The CAR and CAV from 0 to +10 can also be attributed to the large shareholders that own less than 10% (the reporting threshold) and trading in the stock, as they are also frequently participants in the site trips. The large shareholder trading news appears to be particularly well received by average investors, as seen by the increase in CAR after day +10. Though this could also be amplified by the fact that the average investors are more likely to read a press release[35] by the company announcing a private placement and outlining its terms than they are to be vigilantly following the insider trading developments on SEDI and hence more aware of a large shareholder's trade activity.

It could be argued, that since trades often occur within a short timeframe of a press release, that the information on which the market is reacting is not in fact based on the trade of the

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[33] Typically this is done in large groups with multiple investors (or their representatives) to try and create competition for financing offers.

[34] I myself have been lucky enough to have participated in such a trip, and was able to view unanalyzed and unpublished drill cores which contained large amounts of visible gold. The share price of that company rose significantly in the days immediately following that trip on abnormally high volume, indicating that it was highly likely trading was occurring based on the interpretations of what was seen in the cores that were presented.

[35] Again, this could be compounded by the fact that the press release announcing the private placement normally appears at the same time as the SEDI release of large investor's trade.

insider, but rather that it is an interpretation of "street gossip" that relates to the information to be contained in the forthcoming press release.

5.7 Senior Officer

Reactions to senior officers begin to occur immediately after the trade day, indicating that their trade information is released into the "street gossip" information channels and that the "street gossip" participants view that information as significant and trade on it. In both purchases and sales of shares, senior officers have a slight run up in CAR demonstrating that they are purchasing (selling) shares at times at which they believe them to be undervalued (overvalued).

Senior officers are traditionally considered to have the greatest degree of information asymmetry compared to an average outside investor, and would then accordingly, be expected to cause the largest CAR, by introducing new information to the market.

From this study, we can determine that this is not true. Investors do not assign the highest absolute amount of CAR to these insiders, though the CAR that occurs for senior officers is statistically significant at a high level. Though, the sheer number of trades completed by senior officers could be diluting the information value that this test indicates investors to be assigning to a senior officer. Investors are more likely to be less concerned with each transaction individually, and more with the aggregate trend of a senior officer's trades, as any single trade could be a simple realization of income, whereas a trend of sales or purchases could indicate asymmetrical knowledge with the market.

The average investor, on the other hand, assigns a very large information value to senior officers, as can be seen by the large upwards spike in CAR after a purchase, and an equally large descent after a sale occurring after the public disclosure of a sale.

5.8 Directors

Based on the results of this study, directors are not seen as having particularly beneficial information by the "street gossip" portion of market participants. Alternatively, it could be argued that due to the relative distance and independence from the company that directors keep, they are not as integrated into the "street gossip" channels, and knowledge of their trade does not spread to market participants as broadly as for other insider categories.

However, the average investor does appear to attribute some informational value to their trades. Judging by the run up in CAR prior to a director's trade, it would seem that they are merely selling at a time when the market value of the share has been high (or at least increasing) and they have simply seen an opportunity to realize gains on their holdings.

Here we can see that directors are observed to have nearly no CAR in sales, though some statistically significant CAR in purchases. This could be due to the fact that directors are generally expected to be at an arm's length from the company, and not involved in its day to day activities, but rather just in making major decisions and acting as a supervisory group. Therefore, investors regard them as having less of an ability to forecast the value of the security. The declines caused by senior officers on the other hand, indicates that investors strongly believe this group of individuals to be the best informed of the reporting parties, and thence the ones to follow when regarding consideration of the company's future.

6 Conclusion

This thesis investigates the information relating to future performance potential conveyed by trades by insiders in junior natural resource companies, and the timing of the information's integration into the security's price. This is examined in two manners; the daily and cumulative abnormal price returns caused by insider trades; and the daily and cumulative abnormal volumes caused by insider trades. In order to perform this study I construct a dataset of 313 firms traded on the Venture Exchange of the Toronto Stock Exchange in which 31,047 transactions are made between January 1, 2002 and December 31, 2006.

In accordance with historic literature (Rogoff 1964, Glass 1966, Lorie & Niederhoffer 1968, Scholes 1972, and Jaffe 1974) as well as the more recent (Smith & McNally 2003, Basel & Stein 1979, Lee & Bishra 1990, and Jabbour, Jalivand & Switzer 2000), trades by insiders are interpreted by the market to hold information with regard to future performance potential. My study indicates that this holds true for junior natural resource companies. Different insiders are motivated to trade based on different information, and their trades cause different reactions in the market as demonstrated in their cumulative abnormal return curves. However, the size of the trade made cannot be definitively said to hold any effect on the magnitude of the cumulative abnormal returns caused.

Due to the nature of this industry, insider trade information appears to be available to the market ahead of its official disclosure date. There are as a result, market participants who are able to profit from this information which is at the expense of the uninformed investor.

The problem with this, and indeed all previous similar studies, as Meulbroek (1992) correctly points out, is that they are based on reported insider transactions, which for all legal intents and purposes should not be based on non-public information. In order to truly judge the effects of an insider's trade it should include all violative transactions that would not be reported to SEDI. Only then, could the true effect of an insider's knowledge and the market's interpretation of those trades as a signal be measured. Unfortunately, this also has the problem of being difficult to measure, as unreported transactions are not available in any

database. Although, even from casual review of recent headlines, it is easy to see that this is not an unknown occurrence[36].

Though even the validity of this point could be argued, as although according to Canadian law, an insider is barred from trading when they are in possession of material information that is price sensitive and as of yet undisclosed to the market, the law does not adequately define what this constitutes. These laws are relatively vague in creating a picture of when trading would be illegal or legal, and some companies are finding it difficult to keep insiders from trading on that information due to the relatively low threat of prosecution. This would be for example, in the case of a JNR, when the results of a drill program that would be known for up to one week before their dissemination. Consequently, many companies in the Canadian market (not only JNRs) are instituting formal 48 hour blackout period policies during which insiders cannot trade before a press release or after a news release, to ensure that the market participants are not unduly taken advantage of by those most aware of the implications of the news release.

One could also argue that another potential flaw of this study is that it covers a period of only 20 days, and does not determine the longer term effects of insider trading, such as if it were to decrease back to zero. I counter, that completing such a long time framed study might give inaccurate results, as by a later date a press release and other insider transactions may occur which could impact the results (and indeed may already be a factor in these results as was explained in Figure 8). These factors would be difficult to isolate and remove, and therefore cause an unavoidable bias risk.

With regards to which transactions to include, it could be debated that options should not be included because they don't necessarily represent information pertaining to future performance, but rather for tax and estate planning reasons such as shifting the accumulated value to other accounts in the form of shares (ex. Exercise of options and then transferring the resulting common shares to a registered retirement savings account or spouse).

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36 A classic (and famous) example of illegal Canadian insider trading is Andrew Rankin, who worked in the Royal Bank of Canada's Dominion Securities mergers & acquisition department and was exploited by a friend to find out what major deals were coming up, earning the pair millions in profits. Only a bungled securities trade executed in a panic out of a Luxembourg account exposed the leak (See CBC television broadcast)

6.1 Areas for further research

Though this study sheds some light on the nature of a relatively untransparent market segment, it also leaves open some areas for further research. Unfortunately the following two topics could not be addressed in this study, as time constraints and information availability forced their exclusion. However, I believe that they would be important issues to investigate so that the full effect of insider trading could be analyzed within every affected dimension.

Primarily, I believe that it would be important to investigate the implications of Glosten & Milgrom's (1985) bid-ask spread theory's application here, given the potential for information asymmetry and low market depth. There may indeed be some significant changes in the bid-ask spread as information is released to the market, which would aid in determining the exact timing of the spread of "street gossip", and the changes in market depth associated with insider trades.

Furthermore, determining the relationship between the ownership structure vs. the abnormal returns and volume could also shed some light on the price making power of the market participants for these firms. This could potentially better define which firm structures are susceptible to street gossip, and which firm structures best integrate all public and non-public information into the security's price.

7 Appendices

7.1 Appendix 1: Definition of an Insider According to the Securities Act of Ontario

This is a collection of excerpts from: Section 1. Interpretation, other general matters Definitions of the Securities Act of Ontario which defines the legal meaning of the term "insider" and its subcategories and their definitions in accordance with the Act. For the sake of brevity, the French language equivalent terms and their definitions have been excluded from this material.

"insider" or "insider of a reporting issuer" means,

(a) every director or senior officer of a reporting issuer,

(b) every director or senior officer of a company that is itself an insider or subsidiary of a reporting issuer,

(c) any person or company who beneficially owns, directly or indirectly, voting securities of a reporting issuer or who exercises control or direction over voting securities of a reporting issuer or a combination of both carrying more than 10 per cent of the voting rights attached to all voting securities of the reporting issuer for the time being outstanding other than voting securities held by the person or company as underwriter in the course of a distribution, and

(d) a reporting issuer where it has purchased, redeemed or otherwise acquired any of its securities, for so long as it holds any of its securities,

"senior officer" means,

(a) the chair or a vice-chair of the board of directors, the president, a vice-president, the secretary, the treasurer or the general manager of a company or any other individual who performs functions for an issuer similar to those normally performed by an individual occupying any such office, and

(b) each of the five highest paid employees of an issuer, including any individual referred to in clause (a),

"director", where used in relation to a person, includes a person acting in a capacity similar to that of a director of a company,

"reporting issuer" means an issuer,

(a) that has issued voting securities on or after the 1st day of May, 1967 in respect of which a prospectus was filed and a receipt therefor obtained under a predecessor of this Act or in respect of which a securities exchange take-over bid circular was filed under a predecessor of this Act,

(b) that has filed a prospectus and has obtained a receipt for it under this Act,

(b.1) that has filed a securities exchange take-over bid circular under this Act before December 14, 1999,

(c) any of whose securities have been at any time since the 15th day of September, 1979 listed and posted for trading on any stock exchange in Ontario recognized by the Commission, regardless of when such listing and posting for trading commenced,

(d) to which the *Business Corporations Act* applies and which, for the purposes of that Act, is offering its securities to the public,

(e) that is the company whose existence continues following the exchange of securities of a company by or for the account of such company with another company or the holders of the securities of that other company in connection with,

(i) a statutory amalgamation or arrangement, or

(ii) a statutory procedure under which one company takes title to the assets of the other company that in turn loses its existence by operation of law, or under which the existing companies merge into a new company, or

(f) that the Commission has deemed to be a reporting issuer under section 83.1,

where one of the amalgamating or merged companies or the continuing company has been a reporting issuer for at least twelve months,

"issuer" means a person or company who has outstanding, issues or proposes to issue, a security,

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